FINAL
CLOSURE ASSESSMENT
WORK PLAN
FOR
SITES 2 AND 10

119th FIGHTER-INTERCEPTOR GROUP
NORTH DAKOTA AIR NATIONAL GUARD BASE
HECTOR FIELD
FARGO, NORTH DAKOTA

JUNE 1994

Prepared for

Air National Guard Readiness Center
Andrews Air Force Base,
Maryland 20331-6008

Submitted by

Hazardous Waste Remedial Actions Program
Oak Ridge, Tennessee 37831
Managed by
Martin Marietta Energy Systems, Inc.
for the U.S. Department of Energy

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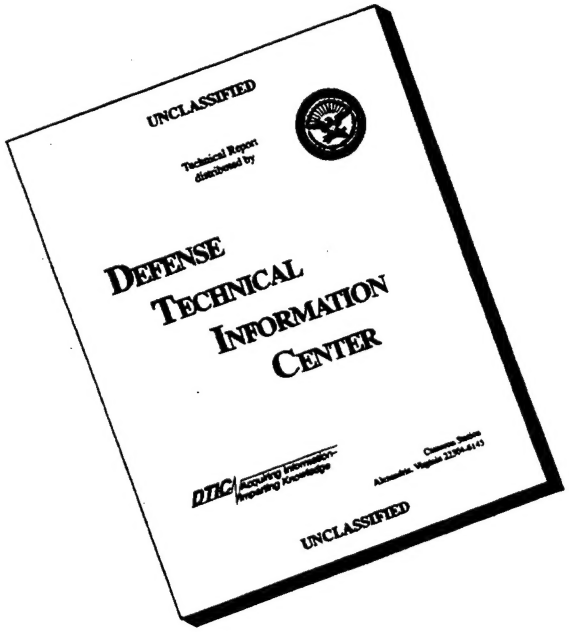

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Per Haley Wihongi
ANGRC/CEVR

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LIST OF ACRONYMS AND ABBREVIATIONS

ANG	Air National Guard
ANGRC	Air National Guard Readiness Center
BGS	below ground surface
BTEX	the sum of benzene, toluene, ethylbenzene, and xylenes
COC	chain-of-custody
DOE	Department of Energy
EPA	(United States) Environmental Protection Agency
ES	Engineering-Science, Inc.
HAZWRAP	Hazardous Waste Remedial Actions Program
NDANG	North Dakota Air National Guard
NDSDH&CL	North Dakota State Department of Health and Consolidated Laboratories
OSHA	Occupational Safety and Health Administration
PEER	PEER Consultants, P.C.
PID	photoionization detector
ppm	parts per million
ppmv	parts per million by volume
PVC	polyvinyl chloride
QAP	Quality Assurance Procedure
QC	quality control
SI	Site Investigation
SOP	Standard Operating Procedures
TCLP	Toxicity Characteristic Leaching Procedure
TOX	Total Organic Halogens
TPH	Total Petroleum Hydrocarbons
UST	underground storage tank
WP	Work Plan

DRAFT FINAL
CLOSURE ASSESSMENT
WORK PLAN
FOR
SITES 2 AND 10

1.0 INTRODUCTION

1.1 BACKGROUND

This Work Plan (WP) outlines closure assessment activities to be conducted at two sites at the North Dakota Air National Guard (NDANG) Base, Hector International Airport (also known as Hector Field), Fargo, North Dakota (Figure 1.1). The sites to be assessed include one 300-gal nominal capacity waste oil underground storage tank (UST) which is scheduled to be removed (Site 2), and a former fire training area (Site 10) where removal of contaminated soils is scheduled. The objectives of the assessment are to provide documentation of soil and water conditions following excavation of the UST at Site 2 and excavation of contaminated soils at Site 10 in order to support closure in accordance with applicable North Dakota State Department of Health and Consolidated Laboratories (NDSDH&CL) requirements.

The Air National Guard Readiness Center (ANGRC) provides support to Air National Guard (ANG) facilities to conduct UST closure assessments, site assessments, and evaluate and design potential corrective actions at leaking UST and spill sites. The Department of Energy (DOE), through an existing Interagency Agreement with the Air Force, provides technical assistance in implementing the UST assessment and remediation for the ANGRC. Martin Marietta Energy Systems, Inc. was assigned the responsibility of managing the Hazardous Waste Remedial Actions Program (HAZWRAP) for DOE. This WP was prepared by PEER Consultants, P.C. (PEER), under the direction of HAZWRAP.

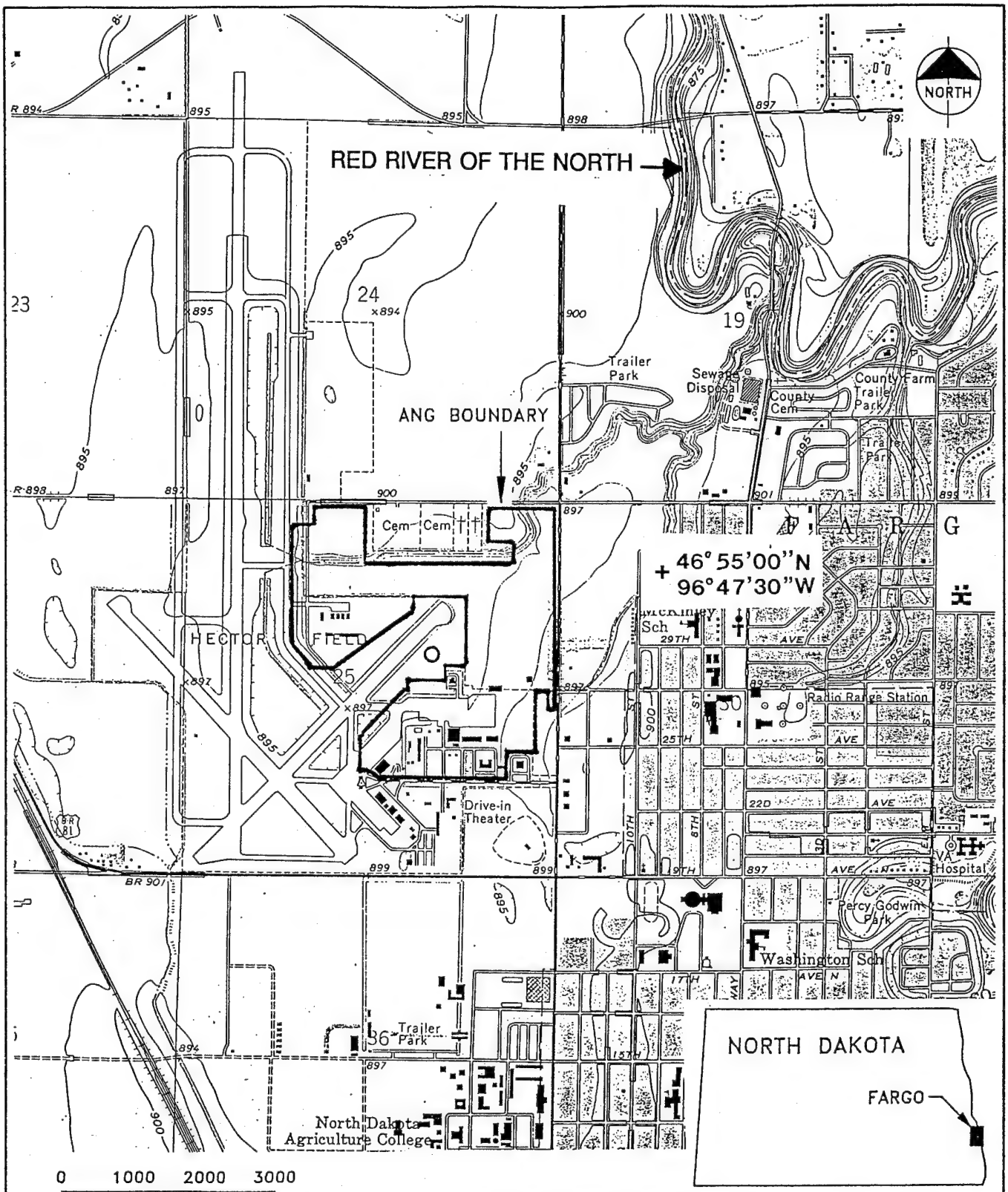
1.2 SITE DESCRIPTION

The 119th Fighter Interceptor Group of the NDANG is located adjacent to Hector Field near Fargo, in Cass County, North Dakota (Figure 1.1). The Base leases 133 acres in the southeastern corner of the airport from the city of Fargo, and has been in operation since 1947 [Engineering-Science (ES) 1991].

The following descriptions were summarized from the SI Report (ES 1991).

Site 2

The location of Site 2 is shown on Figure 1.2. The UST is marked at the surface by a stand pipe. It is unknown at this time whether the stand pipe was a fillport, vent, or other appurtenance. The site was originally identified as a storage area between the apron and Building 217.



SOURCE: USGS, FARGO NORTH QUADRANGLE, NORTH DAKOTA–MINNESOTA; ENGINEERING SCIENCE, INC., 1991

PEER CONSULTANTS, P.C. OAK RIDGE, TN.	FIGURE 1.1 LOCATION MAP NORTH DAKOTA AIR NATIONAL GUARD BASE HECTOR FIELD, FARGO	PROJ./DISK: 3070249102	SCALE: AS INDICATED
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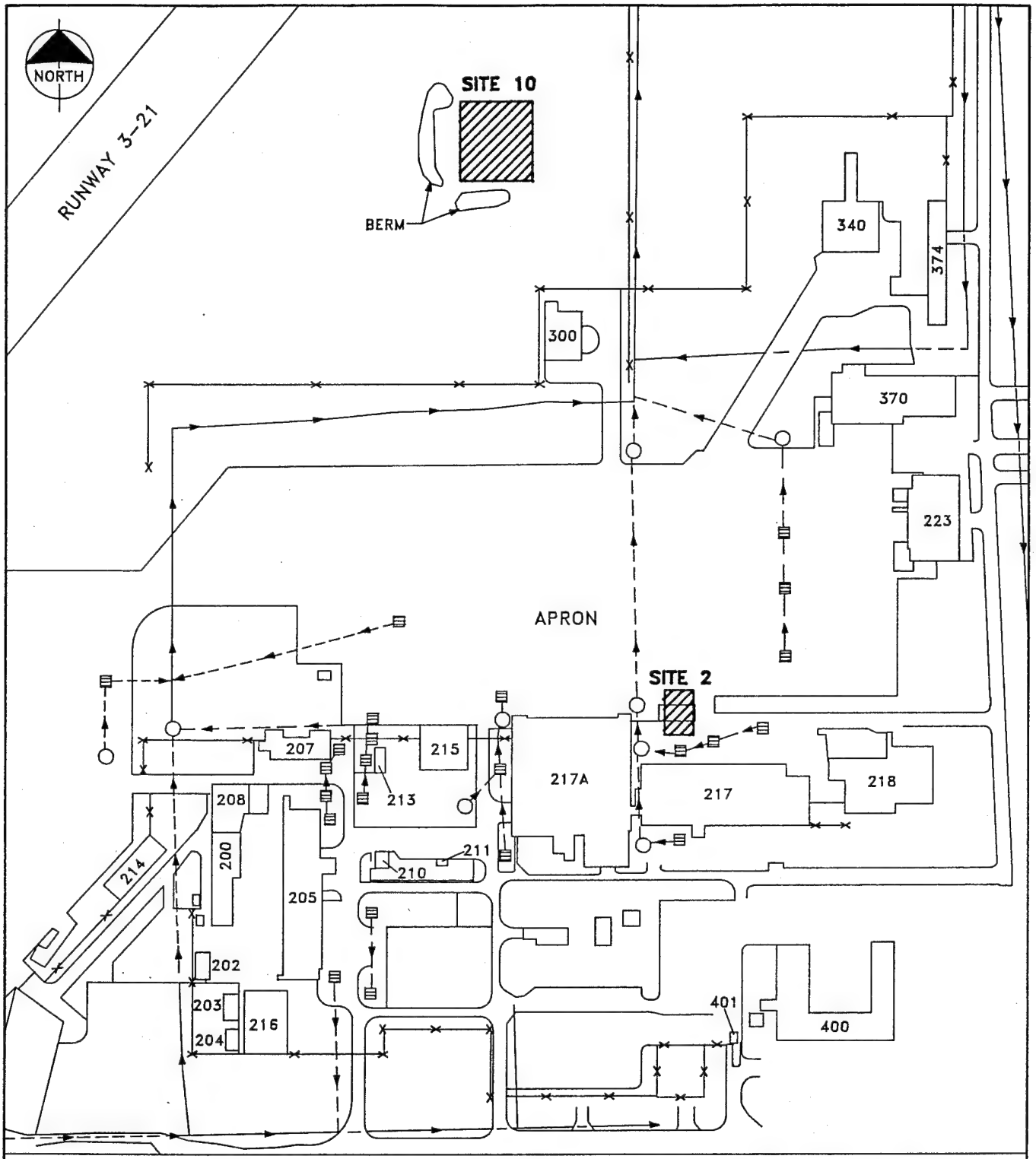

PEER CONSULTANTS, P.C. OAK RIDGE, TN.	FIGURE 1.2 LOCATION OF SITES 2 AND 10 NORTH DAKOTA AIR NATIONAL GUARD BASE HECTOR FIELD, FARGO	PROJ./DISK: 3070249102	SCALE: AS INDICATED
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Site 10

The location of Site 10, the former fire training area, is shown on Figures 1.1 and 1.2. The site is located outside the NDANG boundary on property owned by the city of Fargo. The fire training area consists of an open, generally flat area with a burn pit and no confinement structure. The burn pit area is approximately 75 ft by 100 ft wide. Airplane debris are evident within the burn pit area. An irregular berm of soil with concrete debris and trees lies just west of the site, and a slight ridge of soil along the northeast side of the burn pit suggest a berm was also present in this region. Concrete debris are scattered over the site, and several drums, an abandoned bus, and a small building lie between the burn pit and a fence to the east. The burn pit area was noted to be devoid of vegetation during the site investigation (SI), except along the edges where grass was starting to return.

1.3 ENVIRONMENTAL SETTING

The following environmental setting was summarized from the SI Report (ES 1991).

1.3.1 Meteorology

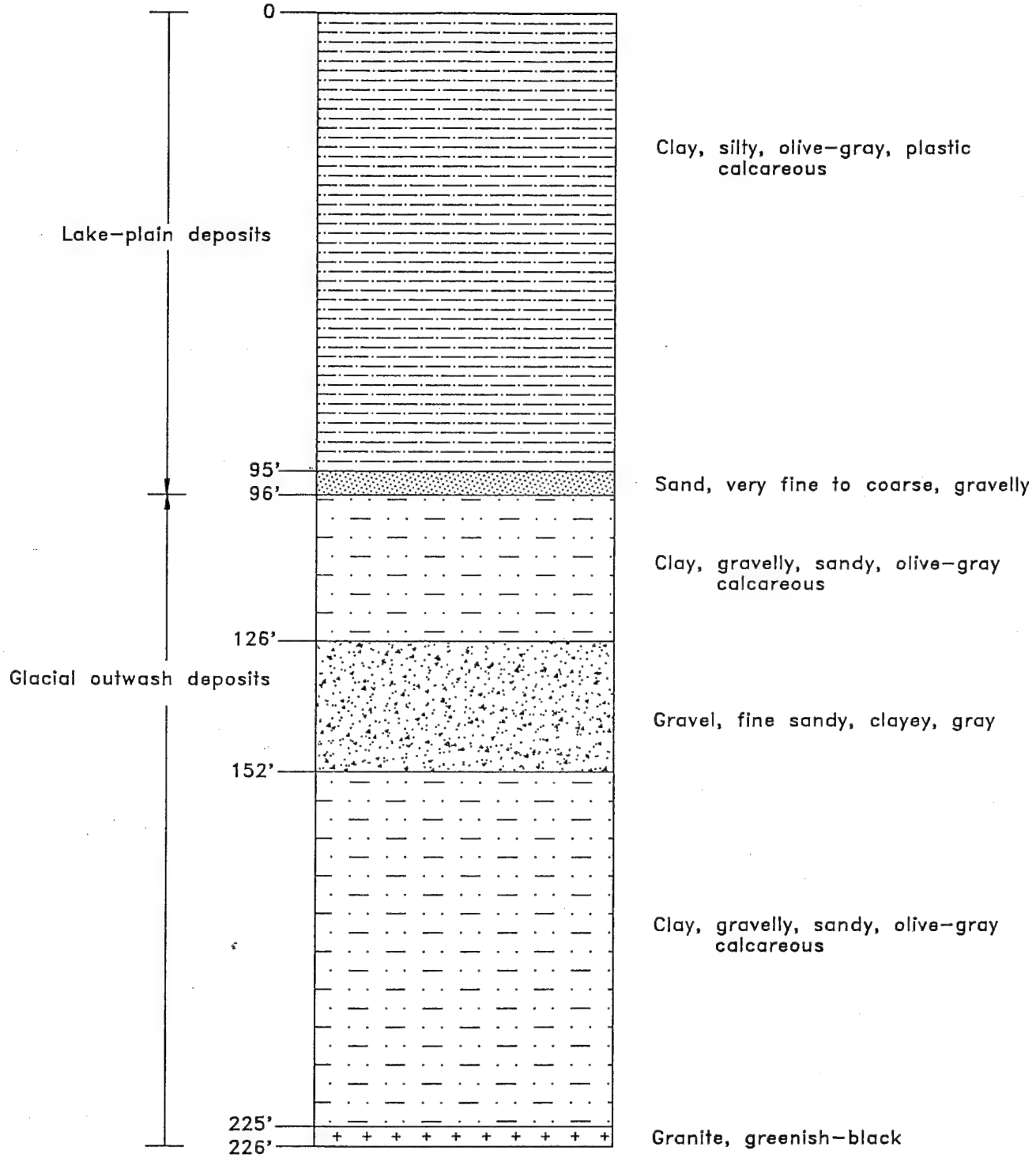
The climate in the vicinity of the NDANG Base is characterized by long, cold winters and short summers. The average daily temperature ranges from 20°F in the winter to 82°F in the summer. The mean annual precipitation is 21 in., which includes 16 in. of rainfall between April and September and 36 in. of snow. The prevailing wind is from the north.

1.3.2 Geology

The NDANG Base lies in the Central Lowland physiographic province on the Lake Agassiz Plain. Precambrian granite bedrock underlies approximately 200 ft of glacial deposits and 100 ft of lake plain deposits. A generalized stratigraphic section from a borehole southwest of the Base is shown on Figure 1.3.

The glacial deposits consist chiefly of till, a heterogenous mixture of silt and clay with subordinant amounts of sand, gravel, and boulders. The glacial deposits are overlain by about 100 ft of Pleistocene-age lake-plain materials which were deposited in glacial Lake Agassiz. The deposits are divided into an upper silty unit and a lower clay unit, however the upper unit was not recognized in a test boring near the Base. The lake-plain deposits include fluvial deposits which contain channel sands. These channel sands are lenticular in shape and occur at depths of 5-20 ft beneath the surface.

In the region of Site 2, a massive clay unit lies beneath the fill material (topsoil, sand, and gravel) to approximately 10 ft below ground surface (BGS). Below the clay unit is a unit of mottled clay with a thickness of about 5 ft. Underlying this unit is a layer of varied clay and silt with a thickness of approximately 10 ft.



SOURCE: DRAFT SITE INVESTIGATION REPORT
NORTH DAKOTA AIR NATIONAL GUARD BASE,
HECTOR INTERNATIONAL AIRPORT, FARGO, NORTH DAKOTA;
ESI, 1991

PEER CONSULTANTS, P.C. OAK RIDGE, TN.	FIGURE 1.3 LITHOLOGIC DESCRIPTION OF A TEST BORING NEAR NORTH DAKOTA AIR NATIONAL GUARD BASE HECTOR FIELD, FARGO	PROJ./DISK: 1443K09	SCALE: AS INDICATED
		REVISION NO. 0	FILE: LITHOG.DWG

In the region of Site 10, beneath the burn pit area is a layer of fill material consisting of topsoil, sand, and gravel, approximately 2 to 5 ft thick. Below this layer is a unit of massive clay with a thickness of approximately 3 ft. Underlying the massive clay is a unit of mottled clay approximately 8 ft thick. Beneath this is a unit of varied clay and silt approximately 15 ft thick with lenses of cross-bedded silts and fine sands.

1.3.3 Soils

Two soil units have been described at the NDANG Base: the Fargo silty clay, and the Fargo-Ryan silty clays. Both soil units were derived from glacial lacustrine sediment. The distribution of these soil types is shown on Figure 1.4.

The Fargo silty clay is a deep, poorly drained soil approximately five feet in thickness. The uppermost layer consists of about 10 inches of block silty clay and is underlain by dark gray and dark olive gray silty clay. The clay content of the Faro silty clay locally exceeds 60%. The permeability of the Fargo silty clay ranges from 1×10^{-4} cm/sec to 4×10^{-5} cm/sec.

The Fargo-Ryan silty clay consists of patches of Fargo silty clay and Ryan silty clay too small to mapped individually. The Ryan silty clay is similar to the Fargo silty clay described above, differing primarily by it's occurrence in slight depressions, by being sonic and saline, and having a permeability of less than 4×10^{-5} cm/sec.

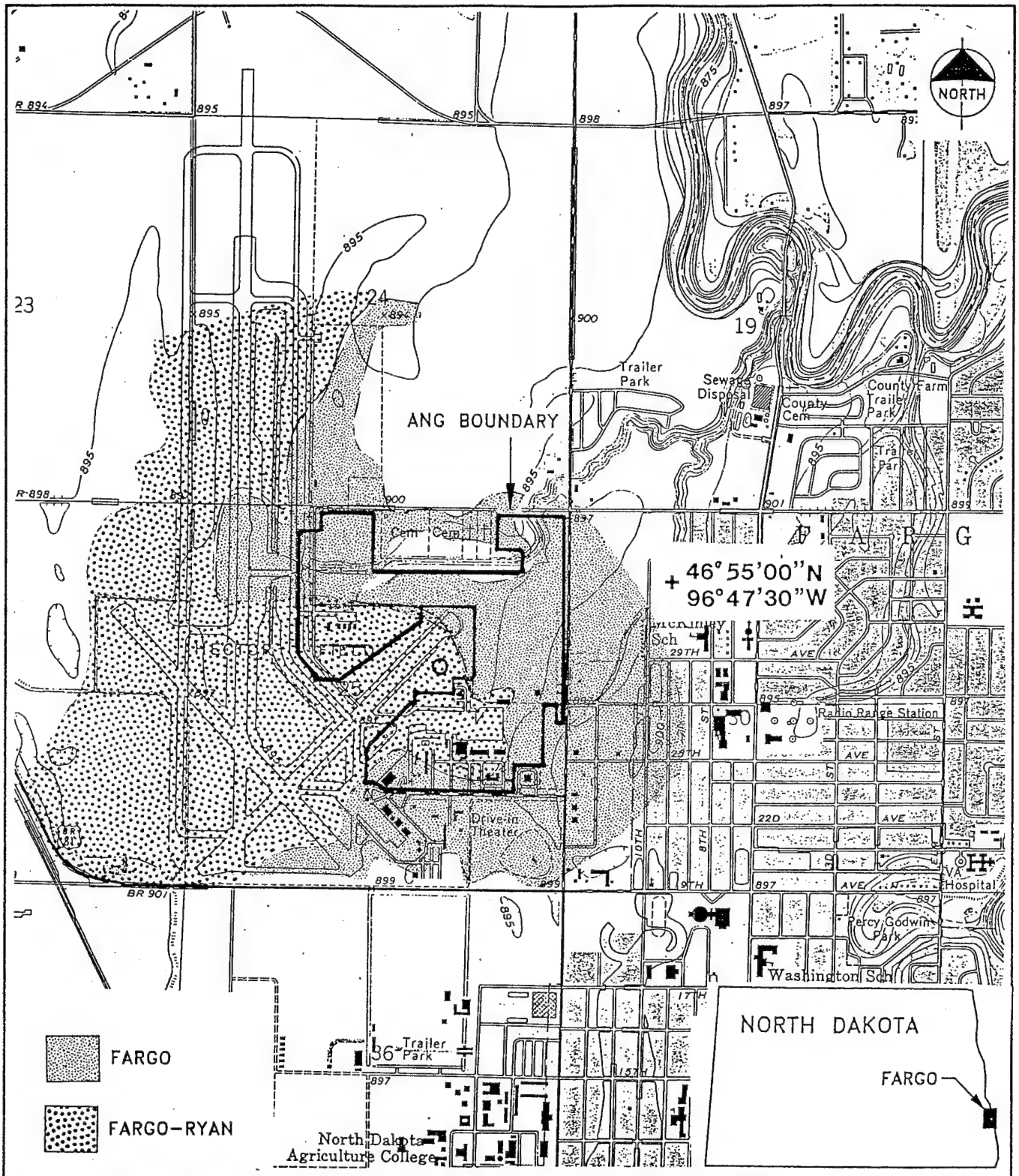
1.3.4 Surface Water

The NDANG Base lies in the Red River drainage basin. There are no natural drainage systems or streams on the Base. Surface runoff is primarily by overland flow which is collected into a series of storm sewers, culverts, and open drainage ditches. These discharge to an open drainage ditch east of Site 10 and eventually discharge into the Red River, which lies about two miles east of the Base.

1.3.5 Hydrogeology

During the SI, groundwater was encountered at depths from 4.5 to 7 ft BGS at Site 2; at Site 10, groundwater was encountered at depths from 6 to 7 ft BGS.

Regional groundwater flow is toward the Red River. Low permeability and low hydraulic gradient result in groundwater velocities in the range of approximately 1.5 ft/yr (0.5 m/yr). The SI Report (ES 1991) indicated that a number of distinct hydrogeologic units are present in the vicinity of the NDANG Base. These include an unconfined aquifer, channel sand aquifers (both of which are contained in the Lake Plain deposits), the Fargo and West Fargo aquifers, which are contained in the underlying glacial outwash deposits. A generalized stratigraphic section (adapted from the SI) showing the relationship between the late-plain and glacial outwash units is shown on Figure 1.3. However, the hydrogeologic units are not resolved on the stratigraphic section.



SOURCE: SOIL SURVEY OF CASS COUNTY AREA, NORTH DAKOTA; USDA SOIL CONSERVATION SERVICE

PEER CONSULTANTS, P.C. OAK RIDGE, TN.	FIGURE 1.4 DISTRIBUTION OF SOIL TYPES IN THE VICINITY OF NORTH DAKOTA AIR NATIONAL GUARD BASE HECTOR FIELD, FARGO	PROJ./DISK: 1443K09	SCALE: AS INDICATED
		REVISION NO. 0	FILE: LITHOG.DWG

Unconfined groundwater in the Lake-Plain deposits occurs at an average depth of 6-8 ft BGS, but these deposits are not significant sources of groundwater due to the low yield. Unconfined groundwater also occurs in the channel sand deposits, which have been mapped in the vicinity of the Base, occur at depths of 5-20 ft BGS, and range in thickness up to 60 ft. Use of the channel sand aquifers is limited to domestic and farm production water supplies.

The Fargo and West Fargo aquifers are important sources of groundwater in Cass County. Both aquifers are confined and recharge is slow. The Fargo and West Fargo Aquifers are both comprised of glacial outwash deposits of fine- to coarse-grain sand interbedded with gravel. The top of the Fargo Aquifer, which has an average thickness of about 45 ft, is present at a depth of approximately 100 ft BGS. The West Fargo Aquifer has an average thickness of about 60 ft. The Fargo and West Fargo Aquifers do not appear to be hydrologically connected. The aquifers are used for domestic and farm production water supplies.

A summary of hydrogeologic data from the SI Report is provided in Table 1.1. Hydraulic conductivity of unconsolidated material at the two sites was calculated during the course of the SI, and found to range from 7×10^{-6} cm/sec to 5×10^{-4} cm/sec at Site 2, and 7×10^{-6} cm/sec to 3×10^{-5} cm/sec at Site 10. The direction of groundwater flow at the base was found to be variable. In the vicinity of Site 2, groundwater appears to be mounded over the UST pit, and flows radially away from the tank at a gradient of 0.01 ft/ft to 0.003 ft/ft. In the vicinity of Site 10 groundwater flows toward the southeast and northeast at a gradient of 0.002 ft/ft.

Table 1.1

Summary of Hydrogeologic Data for Site 2 and Site 10
North Dakota Air National Guard Base
Hector Field, Fargo

Site	Monitoring Well	Hydraulic Conductivity (cm/s)	Groundwater Velocity (ft/yr)	Hydraulic Gradient (ft/ft)
2	MW8 & MW9	7×10^{-6} 5×10^{-6}	0.09 - 26	0.003 - 0.01
10	MW2 & MW5	3×10^{-5} 7×10^{-6}	0.02 - 0.23	0.002 typical

Source: Engineering Science, 1991

2.0 SITE HISTORY

An SI Report for the NDANG Base was previously prepared for the ANGRC in August 1991, as a part of the Installation Restoration Program. Hydrocarbon contamination was detected in shallow soils in the area surrounding the UST at Site 2, but the extent appeared to be limited because this contamination was not detected in the shallow wells surrounding the site (ES 1991). Hydrocarbon contamination was also detected in the near-surface soils within the immediate area of the burn pit at Site 10, the former fire training area (ES 1991).

2.1 SITE 2

At Site 2, an UST was installed in 1959, and taken out of service around 1984. As of January 1994, the tank has not been removed from the ground. The 300-gal nominal capacity steel tank was used to store waste oils. The tank was reported to have a hole in it which allowed leaks. According to Base personnel, the UST was pumped free of oil at the time of closure.

During the SI, soil gas and soil headspace surveys were conducted, and soil borings, monitoring wells, and a piezometer were installed. Soil-gas/soil headspace samples were field screened for halogenated volatile organics and aromatic hydrocarbons, soil and groundwater samples were submitted for laboratory analysis for volatile organic compounds, semivolatilc organic compounds, polychlorirated biphenyls, and metals. It should be noted however, that no samples were analyzed for Total Petroleum Hydrocarbons, for which the North Dakota State Department of Health and Consolidated Laboratories (NDSDH&CL) has defined specific regulatory requirements. Results of the SI indicated that hydrocarbon contamination is limited to the immediate area around the UST.

The UST and any grossly contaminated soils in the immediate area of the pit have been identified for removal.

2.2 SITE 10

Fire training exercises occurred every three months from the late 1950s to 1983 at the former fire training area. Between 1983 and mid-1989, the exercises were conducted every two months. Approximately 300 to 400 gal of JP-4 (jet fuel) were used during each exercise. Use of solvents was minimal. Between 1987 and 1989, fire training exercises were conducted using pans to restrict seepage of fuel into the soils. The exercises were stopped in 1989.

During the SI, soil gas and soil headspace screenings were conducted, and soil borings and monitoring wells were installed. Soil-gas/soil headspace samples were field screened for halogenated volatile organics and aromatic hydrocarbons, soil and

groundwater samples were submitted for laboratory analysis for volatile organic compounds, semivolatilc organic compounds, polychlorirated biphenyls, and metals. It should be noted however, that no samples were analyzed for Total Petroleum Hydrocarbons, for which the NDSDH&CL has defined specific regulatory requirements. The results of the SI indicated that the extent of hydrocarbon contamination was found to be limited to the immediate vicinity of the burn pit. This area is approximately 75 ft by 100 ft wide and up to 15 ft deep. During the SI, petroleum odors were noted in the area.

The contaminated soils are scheduled to be removed and treated on-site.

3.0 CLOSURE ASSESSMENT PLAN

3.1 OBJECTIVE

This WP outlines recommended closure assessment activities to be conducted at the UST site, Site 2, and the former fire training area, Site 10. The objectives of the closure assessments are to document soil and water conditions after excavation in order to support the regulatory closure of the sites.

3.2 REGULATORY GUIDANCE

A guidance document, "Permanent UST System Closure and Changes-In-Service", issued by the NDSDH&CL (Appendix A) requires a three step procedure be followed during UST closure, specifically:

1. Notify the NDSDH&CL in writing at least 30 days before beginning closure.

2. Empty and clean the UST by removing all liquids and accumulated sludges.

3. Measure for the presence of a release where contamination is most likely to be present at the site (i.e., site assessment).

Upon removal of an UST, if there is no visual or olfactory evidence of petroleum contamination or no evidence based on field screening, the state does not require further sampling or monitoring (Appendix A). If there is evidence of petroleum contamination, then the state requires that samples be collected and analyzed, and the level and extent of contamination be delineated using general standard cleanup criteria, as described in the following section.

Cleanup Criteria

The NDSDH&CL has developed general standard cleanup action levels for soil and groundwater, where petroleum contamination is concerned. These action levels are contained in a guidance document, "Cleanup Action Level Guidelines for Gasoline and Other Petroleum Hydrocarbons", issued in January, 1992, and can be summarized as:

- total petroleum hydrocarbons (TPH): 100 ppm in soil; 0.500 ppm in groundwater;

- benzene: 0.005 ppm in groundwater.

For the purposes of corrective action, final cleanup levels and cleanup methodologies for soils and groundwater are determined on a site-specific basis by the Division of Waste Management and the Division of Water Quality, respectively. The NDSDH&CL

Division of Waste Management has established a site specific cleanup standard for the sum of benzene, toluene, ethylbenzene, and xylenes (BTEX) in soil of 40 ppm, with a benzene concentration not to exceed 500 ppb (Appendix B). Cleanup levels for petroleum contaminated surface water are established by the Division of Water Quality.

Generally, cleanup decisions are based upon the types and levels of petroleum contamination present, and upon the site-specific degree of risk posed by the contamination to human health and the environment, in accordance with the following factors:

1. the location of the site in relation to the surrounding population;

2. the presence of free product;

3. the presence and proximity of municipal utilities;

4. the potential for migration of vapors;

5. the hydrogeology of the site and groundwater use;

6. the use and location of wells potentially affected by the release; and

7. the future site use.

Based on the low hydraulic conductivity of site soils [0.06 to 0.2 in/hour (0.15 to 0.51 cm/hour)] (ES 1991), the absence of surface streams, the slow rate of groundwater movement [1.5 ft/yr (0.46 m/yr)] (ES 1991), and the absence of residential dwellings and water supply wells, the degree of risk posed by any petroleum contamination at Sites 2 and 10 can be assumed to be low.

The level of petroleum contamination at Sites 2 and 10 will be re-evaluated during site closure by collecting and analyzing soil and groundwater (if present) samples. Surface water samples are not anticipated to be required. Soil or groundwater which is found to contain contaminant levels which exceed the established guidance limits (action levels) will be considered to be petroleum contaminated. Contaminated soils must be remediated in-situ or removed from the site and treated in accordance with NDSDH&CL requirements until the TPH level is below 100 ppm, BTEX is below 40 ppm, and benzene below 500 ppm. Contaminated groundwater must be remediated until the TPH level is below 0.500 ppm and benzene is below 0.005 ppm.

Hazardous Waste Determination

All excavated soils are required to be stockpiled and sampled in accordance with the "Guidelines for the Disposal of Tank Sludge," Section IV (Appendix A). The NDSDH&CL requires samples from gasoline/diesel sources be evaluated for the characteristic of ignitability if they are found to contain free liquids using the Paint Filter Liquids Test, and that an extract be obtained by the Toxicity Characteristic Leaching Procedure (TCLP) from the samples and analyzed for benzene and lead. Samples from waste/used oil sources are required to be analyzed for total organic halogens (TOX), and an extract is required to be obtained by the TCLP from the samples and analyzed for benzene, chromium, and lead. The samples must also be evaluated for ignitability if they are found to contain free liquids using the Paint Filter Liquids Test. If land treatment is proposed for remediating either type of contaminated soils, then the pH of the samples should also be determined (Appendix A).

The sampling frequency for characterizing stockpiled soils is determined using the following guidelines (Appendix A):

Volume of Soil (yd^3)	Number of Samples
< 10	0
10-50	1
50-500	2
500-1000	3
1000-2000	4
2000-4000	5
Each additional 2000	One additional sample

Excavated soils that are nonhazardous, i.e., for which the analytical parameters are within regulatory limits, but are petroleum contaminated may be treated in accordance with NDSDH&CL requirements. Soils that fail must be managed as regulated hazardous waste.

3.3 CLOSURE ASSESSMENT APPROACH AND SCOPE

The UST removal at Site 2 and the excavation of contaminated soils from the burn pit area at Site 10 will be performed by a Construction Contractor in accordance with plans and specifications prepared by the NDANG. Dimensions for excavations will be provided in these documents.

The closure assessment will be conducted in two general phases. The first phase will include oversight during the removal by the Construction Contractor of the tank at Site 2, its associated piping and other appurtenances and the contaminated soils at Site 10. During this phase, excavated soils will be field screened for the presence of ionizable organic compounds and stockpiled. Soil samples will be collected from each of the stockpiles and soil and groundwater (if present) samples will be collected from the resulting excavations for laboratory analysis. All pertinent health and safety procedures will be followed, in accordance with the Health and Safety Plan provided in Appendix B.

The second phase will begin once analytical results have been received from the laboratory. At either site, if results indicate that the applicable action levels have not been exceeded for the excavation (pit walls and floor), and no contaminated groundwater is found to be present, then the excavation will be backfilled. At Site 2, the excavation will be backfilled with the stockpiled soils if they are found to be nonhazardous and the applicable petroleum-contamination action levels have not been exceeded, otherwise it will be backfilled with clean fill material. At Site 10, the excavation will be backfilled with clean fill material.

If the soils and/or groundwater in either of the excavations (Site 2 or Site 10) are determined to exceed action levels following any necessary overexcavation, then the excavations will not be backfilled. Instead, additional assessment activities will be planned and conducted to determine the level and extent of subsurface contamination remaining at either site, and a corrective action plan will be prepared in accordance with NDSDH&CL requirements. Petroleum-contaminated soil may be treated either ex-situ or in-situ. Recommended in-situ treatment technologies include biodegradation and venting. The preferred ex-situ treatment technology is landfarming at a permitted landfill, although permission to landfarm soils on-site may be requested by filing a permit application. A Corrective Action Plan is being prepared for the excavated soils at Sites 2 and 10 (PEER 1993). Other ex-situ options include asphalt batching and aeration.

The scope of services to be performed by the contractor responsible for oversight during the closure assessment will include:

- assisting the Contracting Officer or their authorized representative in supervising the removal of any product still present in the UST (Site 2);
- assisting the Contracting Officer or their authorized representative in supervising the removal of the UST and the stockpiling and segregating of the excavated soils (Site 2);
- assisting the Contracting Officer or their authorized representative in supervising the removal of the contaminated soils (Site 10);
- inspecting the tank and piping and field screening the excavations using a photoionization detector (PID) (Site 2);

- inspecting and field screening the contaminated soil excavation (Site 10);
- collecting water samples (if present) from the excavations (Sites 2 and 10);
- collecting soil samples from within the excavations (Sites 2 and 10);
- collecting samples from the stockpiled (excavated) soils (Sites 2 and 10);
- screening soil and water (if present) samples using a PID (Sites 2 and 10);
- submitting soil and water (if present) samples to a laboratory for analysis (Sites 2 and 10);
- assisting the Contracting Officer or their authorized representative in supervising the backfilling of the excavations (Sites 2 and 10);
- providing recommendations for management of the excavated soils (Sites 2 and 10); and
- preparing a closure report which documents the findings and conclusions of the closure assessment (Sites 2 and 10).

Field activities will be conducted according to this WP, but may be modified in response to actual site conditions. Any changes made in the field will be discussed with the Base civil or environmental engineer and approved by the ANGRC, HAZWRAP and PEER Program Managers before implementation.

3.4 FIELD METHODS

The following subsections describe the field methods to be employed in performing the above inspection, screening, and sampling activities. The field methods are in accordance with PEER Standard Operating Procedures (SOPs) (PEER 1991).

3.4.1 Excavation and UST Removal Inspections

During removal activities, PEER will assist the Contracting Officer or their authorized representative in ensuring that the excavated soils are inspected for visual or olfactory evidence of petroleum contamination; field screened for the presence of photoionizable organic compounds using a PID; and that excavated soils showing evidence of petroleum contamination are segregated from apparently clean soils by the Construction Contractor and placed on an impervious material such as polyethylene sheeting. PEER will ensure that the stockpiled soils are properly bermed and covered. The approximate volume of clean and petroleum-contaminated soils excavated at each site will be documented. Also, as part of the PEER's oversight responsibilities, once the tank and associated piping is removed at Site 2, their condition will be checked and documented in the field logbook, including corrosion (pitting or holes). Photographs, including a scale for size determination, will be taken of the USTs and of the excavations (pit walls and floors).

3.4.2 Field Screening

Once the UST and necessary soils are removed, the pit will be visually inspected, and screened for photoionizing compounds using a PID. If recoverable quantities of free product are detected in the pit, the ANGRC and HAZWRAP Program Managers will be notified by telephone and will determine additional actions to be taken. Since Occupational Safety and Health Administration (OSHA) regulations restrict personnel from entering pits under certain conditions, the pit walls at both sites will be screened by placing the PID probe at an arms-length distance into the pits or by attaching a Tygon™ tube extension on the PID intake. The pit floor soils will be screened by either scanning soils in the backhoe bucket or by using an extension to the PID. Each wall of the pit will be screened, and the PID readings will be documented in the field logbook. During the PID screening, the pit will be checked for signs of petroleum contamination, such as staining, and olfactory evidence. Any signs of contamination will be documented in the field logbook and photographs obtained.

The piping trenches at Site 2 will also be inspected, and scanned with a PID. The inspections will start at the location of the former tank and follow the pipe trench to its end point. At a minimum, trenches will be scanned with a PID at their starting and end points, and at two points in between, which will be chosen based on soil types and visual and olfactory indications of petroleum. Any area in the trench in which contamination is suspect will be screened with the PID. The presence or absence of soil staining, olfactory indications, and ionizable organic compounds will be documented in the field logbook and photographs obtained.

3.4.3 Groundwater Sampling

Based on previous assessment activities, groundwater is approximately 4 to 7 ft below the ground surface in the vicinity of the NDANG Base, therefore, groundwater is likely to be encountered during excavation activities (ES 1991). If groundwater is encountered, it will be sampled with a decontaminated Wheaton bottle or polyvinyl chloride (PVC) bailer. One sample will be collected from each pit, for a total of 2 samples. The Wheaton bottle or bailer will be slowly lowered into the pit so that the groundwater will not be unduly agitated or aerated as it enters the bottle or bailer, then submerged into the water, and allowed to fill. When a sufficient sample has been collected, it will be carefully removed from the pit to avoid contact with the pit walls and to avoid agitating the water sample.

Samples to be analyzed for volatile organic compounds (benzene) will be collected first in two, pre-cleaned 40-mL vials with preservative already added. Each vial will be slowly filled to minimize sample aeration and agitation. Once the water sample forms a meniscus over the vial rim, the sample will be capped, inverted, and checked for trapped air. If bubbles are present, another sample will be collected. Next, the sample to be analyzed for semivolatile organic compounds (TPH) will be collected in a

1-L glass container. After sample collection, containers will be wiped with a clean paper towel, labeled, packed in a cooler with double-bagged ice or blue ice, and cooled to 4°C.

Samples will be analyzed for benzene by Environmental Protection Agency (EPA) Method 8020, and for TPH by EPA Method 418.1. A summary of sampling requirements is provided in Table 3.1.

3.4.4 Soil Sampling

Confirmatory Sampling

Once enough soil has been removed from the excavations so that no further observable contamination exists or the 2 ft overexcavation limit (in any one direction) is reached, confirmatory soil samples will be obtained.

At Site 2, one soil sample will be collected from the pit floor below the previous tank location and one sample from each of the four sidewalls, for a total of 5 soil samples. Grab samples will be retrieved from the areas exhibiting the greatest evidence of petroleum contamination based on visual, olfactory, and PID screening. If no evidence of petroleum contamination is detected during screening, several composites from random locations will be collected to form one sample from each of the side walls at a distance approximately one third up from the bottom and several composites from random locations will be collected to form one sample from the bottom of the pit. All samples will be taken no less than three inches from the exposed surface being sampled. If visual, olfactory, or PID screening indicate the presence of petroleum contamination in the associated piping trench, then two additional samples will be collected.

At Site 10, a total of 17 soil samples will be collected from the pit floor and the four sidewalls. Grab samples will be retrieved from areas exhibiting the greatest evidence of petroleum contamination based on visual, olfactory, and PID screening. If no evidence of petroleum contamination is detected during screening, several composites from random locations will be collected from each side wall for a total of 8 samples. The samples will be obtained at a distance approximately one third up from the bottom of the pit. Several composites from random locations will be collected from within nine equidistant regions of the pit floor, for a total of 9 samples. All samples will be taken no less than three inches from the exposed surface being sampled.

The approximate locations of samples collected will be documented in the field logbook. Photographs of sampling locations will be obtained. The Construction Contractor performing the excavation will remove soil for samples from the pits with the backhoe if the excavation is too deep to allow personnel to enter. To minimize pit wall slumping onto the pit floor, the pit floor will be sampled first.

Table 3.1. Summary of Analytical Methods, Proposed Number of Samples,[1] Container Types, and Preservatives

Sample Type	Parameter	Analytical Method	No. of Samples	Duplicates	Container Type	Preservative Requirements
Soil Samples--Pits	TPH	418.1	17+5=22	1	250-mL glass	Cool, 4°C
	Benzene	8020	17+5=22	1		
	BTEX	8020	17+5=22	1		
Soil Samples--Stockpiles	Ignitability on liquid from Paint Filter Liquids Test	9095	5+5=10	0	250-mL glass	Cool, 4°C
	pH	9045	5+5=10	0	250-mL glass	Cool, 4°C
	Site 2:					
	TOX	9020	5	0	250-mL glass	Cool, 4°C
	TCLP: benzene, chromium, lead	TCLP-1310: 8020 218.2, 239.2	5	0	250-mL glass	Cool, 4°C
	Site 10:					
	TCLP: benzene, lead	TCLP-1310: 8020 239.2	5	0	250-mL glass	Cool, 4°C
Groundwater Samples	Benzene	8020	1+1=2	1	2, 40-mL glass vials	4 drops HCl, Cool, 4°C
	TPH	418.1	1+1=2	1	1, 1-L amber glass	Cool, 4°C; HCl to pH < 2
Equipment Rinsate	Benzene	8020	1	0	2, 40-mL glass vials	4 drops HCl, Cool, 4°C
Trip Blank	Benzene	8020	1[2]	0	2, 40-mL glass vials	4 drops HCl, Cool, 4°C

[1]Numbers shown are estimates based on the current closure assessments and scope.
[2]One trip blank per trip.
TPH = Total petroleum hydrocarbons.
TOX = Total organic halogens.

Stockpile Sampling

Once all required soil removal activities have been completed at both sites, the stockpiled materials will be sampled and characterized in accordance with NDSDH&CL requirements. The volume of soil in each stockpile will be estimated, and the appropriate sampling frequency determined (Section 3.2). About 10 samples are estimated to be required. Based upon the estimated volume of soil to be removed at Site 2 (1400 yd^3), and the segregation of those soils into clean (1375 yd^3) and contaminated stockpiles (25 yd^3), 5 samples are anticipated to be required. Based upon the estimated volume of soil to be removed at Site 10 (3100 yd^3), 5 samples are anticipated to be required. All samples will be collected a minimum of 1 ft beneath the surface of the pile.

Collection Method

For samples collected from the pits or trenches for confirmation purposes, grab samples and each portion of a composited sample will be collected directly from the pit wall or floor or from the backhoe bucket using a decontaminated stainless steel scoop. For samples collected from the stockpiled soils for characterization purposes, each portion of the composited sample will be collected directly from the pile using a decontaminated stainless steel scoop. Each composite will be comprised of soil which has been collected from at least four discrete locations. The sampler will locate a portion of undisturbed soil, and using the scoop, remove 1 to 2 in. of soil from the top of the undisturbed portion. Once the soil to be sampled is exposed, the sampler will collect the sample by scooping up the soil and placing it in a precleaned, labeled glass 250-mL widemouth container with a Teflon liner in the lid. The samples designated to be extracted by TCLP and analyzed for volatile organic compounds (benzene) will be collected first. Each sample container will be filled to capacity to minimize headspace, and will then be immediately capped. Care will be taken to collect soils which are free from plant matter and gravel or asphalt. After sample collection, containers will be wiped with a clean paper towel, packed in a cooler with double-bagged ice or blue ice, and cooled to 4°C.

Analytical Protocol

Samples collected from the pit and/or trench at Site 2 will be analyzed for TPH, benzene, and BTEX. Samples collected from the stockpiled soils at Site 2 will be analyzed for TOX, and an extract will be obtained by the TCLP and analyzed for benzene, chromium, and lead (requirements specified in Section 3.2). The samples will also be evaluated for ignitability, and pH. Samples collected from the pit at Site 10 will be analyzed for TPH, benzene, and BTEX. Samples collected from the stockpiled soils at Site 10 will be evaluated for ignitability, pH, and an extract will be obtained by the TCLP and analyzed for benzene and lead (requirements specified in Section 3.2). The designated analytical methods, number of samples to be collected, and preservation requirements are provided in Table 3.1.

Analytical results above action levels (Section 3.2) will be reported to HAZWRAP and the ANGRC Project Managers. NDSDH&CL personnel will be contacted to confirm appropriate closure criteria prior to backfilling the excavations.

3.4.5 Field Logbook

During the closure assessments, a field logbook will be maintained to record field data and observations of both contractor and subcontractor's activities. The logbook will be maintained in accordance with PEER SOP F-1, "Field Logbook," (PEER 1991).

The field logbook shall be bound and shall contain sequentially numbered pages, and all entries are to be written in waterproof black ink. The following information will be included in the field logbook:

1. Date and time task started; weather conditions; names, titles, and organizations of personnel performing the task.

2. A description of site activities in specific detail.

3. A description of field screening activities in detail, including instrument calibration.

4. A description in specific detail of samples collected, sample identification numbers, Chain-of-Custody (COC) form numbers (Section 3.5.1), and airbill number or other shipping identification number for samples shipped (Section 3.4.9).

5. Photographic documentation (Section 3.4.11).

6. A list of the time, equipment type, and decontamination procedures followed (if different from WP).

7. A list of equipment failures or breakdowns and description of repairs.

8. Any field changes made to the WP.

9. Tank condition upon removal.

Each page shall be dated and signed by the person making the entry. Incorrect entries must be corrected by drawing a single line through the error, and initialing it.

3.4.6 Instrument Calibration

The portable PID used for screening for the presence of ionizable organic compounds will be calibrated daily according to the manufacturer's instructions and in accordance with PEER SOP F-5, "Field Measurement Using HNu," (PEER 1991). The calibration will be accomplished using 100 ppm isobutylene gas. The instrument will be zeroed using ambient air in an area away from the work zone which is representative of background. Each time the PID is calibrated, it will be documented in the field logbook.

3.4.7 Sample Numbering System

All samples collected will be assigned a unique sample number as described below:

- a 2-digit number representing the PEER project number (e.g., 08 = Project number 1339-008-92);

- a 2-digit number representing the Site I.D. number (e.g., 02 = Site No. 2);

- a 2-character code representing the type of sample (e.g., SS = soil sample, GW = groundwater sample, SP = seep/spring sample, SW = surface water sample, TW = tap water sample);

- A 2-character code representing the collection location of the sample (e.g., for discrete pits, PF = pit floor, EW = east wall; WW = west wall; NW = north wall; SW = south wall; for piping trenches, PT = piping trench; for test pits, UE = tank end/piping trench junction, DE = dispenser end/piping trench junction; for soil stockpiles, SP = stockpile); and

- A 2-digit number representing the approximate depth of the sample in ft below ground surface in the trench or pit, or the coordinate locations for samples from soil stockpiles or trenches.

For example, 08-02-PF-10 represents a soil sample obtained for PEER Project 1339-008-92 from Site No. 2 from the floor of the pit at a depth of 10 ft below ground surface; 08-03-UE-06 represents a soil sample for PEER Project 1339-008-92 obtained from Site No. 3 from a test pit in the vicinity of the end of the tank where the supply piping adjoins it at a depth of 6 ft below ground surface.

3.4.8 Sample Containers and Labels

Sample containers will be purchased new and precleaned from the designated analytical laboratory. Sample volume requirements, preservation techniques, maximum holding times, and container material requirements are dictated by the

medium being sampled and the analyses to be performed. A summary of these requirements is provided in Table 3.1. Field personnel will collect a sufficient volume of each sample in appropriate containers, properly preserved, to allow for all the analyses that are scheduled to be performed.

The sample labels will be supplied along with the bottles. The labels will be placed upon the containers prior to sample collection, and immediately upon collection, a unique sample number will be assigned to each sample in waterproof ink as described in Section 3.4.7.

3.4.9 Sample Packaging and Shipment

Samples will be packed and shipped, as necessary, in accordance with PEER SOP F-3, "Packaging and Shipment of Environmental Samples," within 24 hours of collection. Immediately upon collection, samples will be placed in a shipping container at the point of collection and surrounded with double-bagged water ice (or blue ice) so that the temperature of the samples is maintained at 4°C. Packing material will be used to secure the samples in the shipping container to help prevent breakage of glass containers. Enough packing material shall be placed in the cooler so that the samples do not rattle or shake inside the shipping container. When the samples are deemed secure from breakage and properly iced, the COC form (Section 3.5.1) will be placed in a plastic cover and taped inside the lid of the shipping container. The lid of the container will then be closed, secured using clear or nylon strapping tape, and custody sealed to ensure that samples will not be disturbed during shipment.

Coolers or other shipping containers will be either shipped by a next-day delivery service to the laboratory or hand-delivered to the laboratory by PEER personnel. Hand-delivery of samples that are not to be shipped is described in Section 3.5.1. Notification of shipment, including airbill number, will be telephoned to the laboratory the day of sample collection. Receipt of the previous day's shipment will be confirmed daily. All sample containers, preservatives, and shipping crates/coolers will be supplied by the designated analytical laboratory.

3.4.10 Field Changes

All field activities will be conducted in accordance with this WP, with the exception of changes which may occur in response to unanticipated site conditions encountered during actual field work. Any changes made in the field must be authorized via telephone by the HAZWRAP and PEER Program Managers followed by documentation in accordance with PEER Quality Assurance Procedure (QAP)-001G, "Control of Field Changes," (PEER 1991). All changes must be documented in the field logbook, and on a PEER Field Change Request Form (Figure 3.1).

FIELD CHANGE NO. ___
PAGE ___ OF ___

FIELD CHANGE FORM

PROJECT: _____

PROJECT NO.: _____

APPLICABLE DOCUMENT: _____

REQUESTED CHANGE:

_____

_____

☐ MAJOR CHANGE ☐ MINOR CHANGE

REASON FOR CHANGE:

_____

_____

RECOMMENDED DISPOSITION:

_____

_____

IMPACT ON PRESENT AND COMPLETED WORK:

_____

_____

FINAL DISPOSITION:

_____

_____

REQUESTED BY: _____
NAME AND TITLE SIGNATURE AND DATE

APPROVALS:

ACCEPT	REJECT			
☐	☐	SITE MANAGER: _____	DATE:	_____
☐	☐	PROGRAM MANAGER: _____	DATE:	_____
☐	☐	CLIENT PROJECT MANAGER: _____	DATE:	_____

Figure 3.1

3.4.11 Photographs

During the closure assessments, photographic documentation will be used in accordance with PEER SOP F-21, "Photographic Documentation" (PEER 1991). Photographs will be taken of the sites, excavations, tank, tank pitting or holes, piping trench, and sample locations. Additional photographs may be taken showing typical procedures for excavation and sampling activities.

Each photograph will be logged in the field logbook. Each entry will include: the project name, project number, time, date, and location of the photograph; a description of objects in the photograph; the film roll and frame number; and the person taking the photograph. The first and last frames of the roll of film will be of a signboard containing the site name, project number, roll number, photographer's name, and beginning or ending time and date. Following development of the film, each photograph will be identified by placing a gummed label on the back of the photograph. The label will be typed with the corresponding information from the entry in the field logbook (prior to placement on the photograph), and then signed by the photographer.

3.4.12 Data Reporting

Data quality and data validation is to be controlled in accordance with PEER QAP-002D, "Control of Data Quality and Data Validation" (PEER 1991). This will ensure that all field data gathered or developed will be properly reviewed.

3.4.13 Report Preparation

A report of the closure assessments will be submitted and is to contain field data obtained during the course of the assessments. A draft report will be submitted to HAZWRAP, the ANGRC, and the NDANG Base, and any comments will be addressed before the final report

3.5 QUALITY ASSURANCE AND QUALITY CONTROL

PEER SOPs covering decontamination, quality control (QC) samples, and sample custody will be followed (PEER 1991). Portions of the Quality Assurance/QC Program are summarized in the following subsections.

3.5.1 Chain-of-Custody (COC)

Chain-of-Custody shall be maintained from the time of sample collection through analysis. All samples collected during the closure assessment activities which are designated for laboratory analyses will be documented on a COC Form (Figure 3.2). The original COC Form will accompany all samples from the time of collection through

PEER CONSULTANTS, P.C.

CHAIN-OF-CUSTODY RECORD

COC # _____

PROJECT NO.	PROJECT NAME	NUMBER, TYPE, AND VOLUME OF CONTAINERS	ANALYSES	PRESERVATIVES
SAMPLERS (SIGNATURE)				

ITEM NO.	DATE (MM/DD/YY)	TIME (MILITARY)	COMP	GRAB	SAMPLE NUMBER	MATRIX (1)

Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Analytical Laboratory: _____
Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Contact: _____
Relinquished By: (Signature)	Date/Time	Received By: (Signature)	Phone No: _____

Send results to:

PEER CONSULTANTS, P.C.
575 Oak Ridge Turnpike
Oak Ridge, TN 37830
Attn: _____
(615) 483-3191

Distribution:
White Copy Accompanies Shipment
Yellow Copy to Project Manager
Pink Copy for Field Files

(1) S - Soil SD - Sediment SL - Sludge SW - Solid Waste
GW - Ground Water SW - Surface Water LW - Liquid Waste

Figure 3.2

laboratory receipt. Copies will be maintained by the PEER Site Manager. Each custody transfer will be documented by signature of the relinquishing and receiving individuals, and the date and time of transfer. For samples that are shipped, the airbill or other shipment identification number will be placed on the COC form.

The COC form will document the following information: project name, signature of sampler, sampling station, sample number, date and time of sample collection, grab or composite designation, matrix, preservatives, analyses requested, and signatures of individuals involved in sample transfer.

This procedure will be used throughout the closure assessments to guide the transmittal of information regarding collected samples to the analytical laboratory, and other necessary parties. Samples are considered to be under custody if:

- They are in the sampler's possession, or
- They are in the sampler's line of sight after being in possession, or
- They are in a designated controlled secure area.

The site manager will have overall responsibility for ensuring the care and custody of the samples collected is maintained until they are transferred or properly dispatched to the laboratory. Each individual who collects a sample is responsible for sample custody until transferred to someone else via the COC record.

3.5.2 Decontamination of Field Equipment

Field equipment used for collection of samples such as bailers, Wheaton bottles, or spatulas will be decontaminated between samples in accordance with PEER SOP Q-3, "Decontamination - Field Equipment" (PEER 1991), which involves the following procedure:

- Scrub with laboratory grade detergent such as Liquinox® or Alconox®,
- Rinse with tap water,
- Rinse with distilled water,
- Rinse with methanol, and
- Air dry.

Once air dried, the sampling equipment should be wrapped in plastic or aluminum foil, unless placed in immediate use.

3.5.3 Prevention of Cross-Contamination

To prevent cross-contamination, the individuals performing the sampling tasks will acquire a fresh pair of latex gloves prior to the initiation of each sampling event.

Sampling equipment such as stainless steel spoons and bailers will be decontaminated prior to collection of each sample.

Sample containers and sampling equipment will not be allowed to come in direct contact with the ground or with excavated soils or water. All sample containers and sampling equipment will be protected by placing on plastic sheeting, as needed. Plastic ground covers will be used as needed.

3.5.4 Field Quality Control Samples

To enhance the reliability of field sampling procedures and materials, field QC samples will be collected or prepared as described in the following sections. A summary of analytical methods and collection requirements is provided in Table 3.1.

Duplicates

One duplicate soil sample will be obtained for every 20 soil samples collected and analyzed for semivolatile organic compounds (TPH), benzene, and BTEX. A duplicate groundwater sample (if encountered) will also be analyzed for volatile (benzene) and semivolatile organic compounds (TPH).

Trip Blank

A trip blank will accompany each shipping container containing samples that are to be analyzed for volatile and semivolatile organic compounds at the off-site laboratory. The trip blanks will be supplied by the laboratory and will be analyzed for benzene.

Equipment Rinsate

During the field effort, one equipment rinsate will be collected to assess the effectiveness of the decontamination process. The equipment rinsate will consist of distilled water which is collected into a precleaned sampling container after being passed through a specific item of decontaminated sampling equipment. The equipment rinsate will be analyzed for benzene.

3.6 ADDITIONAL REQUIREMENTS

3.6.1 Health and Safety

All UST closure assessment activities must be conducted in conformance with the Health and Safety Plan (Appendix C).

3.6.2 Backfill Disposal

The contractor performing the actual excavation shall be responsible for the disposal of all unused or contaminated soils.

4.0 PROJECT ORGANIZATION

The project line management consists of:

ANGRC	Carol Ann Beda
HAZWRAP	Ron Alexander
Program Manager	Charlene Morrow
Project/Site Manager	Debby Hines

Project QA oversight includes:

HAZWRAP	(To Be Determined)
PEER	Tom Webb

5.0 PROJECT DELIVERABLES

The list of project deliverables are:

- Closure Assessment Work Plan
- Closure Assessment Report

6.0 REFERENCES

Engineering-Science (ES), Site Investigation Report, August, 1991.

PEER Consultants, P.C., Oak Ridge, Quality Assurance Procedures and Environmental Sampling Operating Procedures, 1991.

PEER Consultants, P.C., Draft Corrective Action Plan, NDANG, August 1993.

APPENDIX A

UST INFORMATION AND GUIDANCE DOCUMENTS
NDSDH&CL

NORTH DAKOTA STATE DEPARTMENT OF HEALTH AND CONSOLIDATED LABORATORIES
DIVISION OF WASTE MANAGEMENT - UNDERGROUND STORAGE TANK PROGRAM

Cleanup Action Level Guidelines for Gasoline and Other Petroleum Hydrocarbons

This document provides cleanup "action level guidelines" for groundwater, surface water and soil contaminated by a release, spill or overfill of gasoline or other petroleum hydrocarbons from an underground storage tank system. Petroleum underground storage tanks are regulated through the North Dakota Underground Storage Tank (UST) Rules: Chapter 33-24-08 of NDAC Article 33-24.

A petroleum UST system is defined as, "...an underground storage tank system that contains petroleum or a mixture of petroleum with ***de minimus*** quantities of other regulated substances. Such systems include those containing motor fuels, jet fuels, distillate fuel oils, residual fuel oils, lubricants, petroleum solvents, and used oils." Under all circumstances, cleanup decisions are made on a site-by-site basis and take into consideration the nature of the release and the site, including the following factors:

1. The location of the site in relation to the surrounding population;
2. The presence of free product;
3. The presence and proximity of municipal utilities;
4. The potential for migration of vapors;
5. The hydrogeology of the site and groundwater use;
6. The use and location of wells potentially affected by the release; and
7. The future site use.

GASOLINE AND OTHER PETROLEUM HYDROCARBON CONTAMINATION

I. Groundwater

Cleanup action levels for groundwater are determined on a site-by-site basis in accordance with criteria established by the Division of Water Quality. In general, however, the following limits can be applied:

Contaminant	Action Level
Benzene	5 ppb (parts per billion)
Total Petroleum Hydrocarbons (TPH)	500 ppb

REV:01/31/92

II. Surface Water

Surface water limits for contamination by gasoline or other petroleum hydrocarbons are established by the Division of Water Quality.

III. Soil and Fill Material

All gasoline contaminated soil and fill material or soil and fill material contaminated by other petroleum hydrocarbons that exceeds a total of 100 parts per million (ppm) TPH as gasoline or fuel oil generally must be removed from the site or treated in-place until the TPH level is below 100 ppm. Treatment or disposal methods should be consistent with the Department's "*Guidelines for Proper Land Treatment of Petroleum Product Contaminated Soils*" or may be handled in any of the methods listed below:

1. Taken to a State-approved landfill for treatment (land-farming). Permission from the owner/operator of the landfill facility is advised before any gasoline contaminated soil or fill is delivered for treatment;

2. Taken to an asphalt plant for reuse in the manufacture of asphalt, contingent on approval by the Division of Environmental Engineering (air quality);

3. Spread on a relatively impermeable material and aerated until the TPH level is below 10 ppm with approval of the Division of Waste Management and local fire and health officials; or

4. Treatment of the soil in-place (biodegradation, leaching, venting, etc.) until the TPH value is less than 100 ppm. If this method is chosen, soil and groundwater samples must be submitted on a regular schedule approved by the Department to monitor progress.

Under certain circumstances, the Division of Waste Management may accept a proposal from the responsible party to leave soil with TPH levels exceeding 100 ppm in-place. Any proposal must provide assurances that concentrations of TPH greater than 100 ppm in the soil will not substantially alter the quality of the environment and that TPH in the contaminated soil will not migrate and contaminate groundwater.

POLICY STATEMENT

The purpose of this policy is to institute contamination cleanup action levels, for petroleum and other petroleum hydrocarbons, that will protect groundwater and the environment. The Division of Water Quality administers the water quality programs in the State of North

Dakota. Cleanup requirements more stringent than those listed in this document may be required by the Division of Water Quality.

This policy sets contamination cleanup action levels that should protect North Dakota's groundwater resource for future use and prevent future groundwater problems through cleanup of contaminated soil. Cleanup of releases from underground storage systems is required by the North Dakota Underground Storage Tank Rules and subject to appropriate enforcement action(s), if deemed necessary.

Once pollution from an UST system has been documented, the Division of Waste Management will require the responsible party (usually the tank owner) to complete an investigation for soil and groundwater cleanup. The investigation must adequately determine the areal and vertical extent of contamination in the soil and groundwater through soil borings and/or installation of groundwater monitoring wells or other techniques approved by the Department. Once the extent of contamination has been determined by the responsible party, a proposal for corrective action may be required. A Corrective Action Plan (CAP) must be submitted for review and approval by the Division of Waste Management and the Division of Water Quality prior to implementation, except as approved by the Department in an emergency situation. All contamination levels must be established using laboratory analytical methods. A list of certified laboratories and recommended sampling and laboratory methods can be obtained from the Division of Waste Management.

Regulatory Agencies

ND State Dept. of Health & Consolidated Laboratories
Div. of Waste Management (701/221-5166)
1200 Missouri Ave., Room 302
PO Box 5520
Bismarck, ND 58502-5520

ND State Dept. of Health & Consolidated Laboratories
Div. of Water Quality (701/221-5210)
1200 Missouri Ave., Room 203
PO Box 5520
Bismarck, ND 58502-5520

ND State Dept. of Health & Consolidated Laboratories
Div. of Environmental Engineering (701/221-5188)
1200 Missouri Ave., Room 304
PO Box 5520
Bismarck, ND 58502-5520

GUIDELINES FOR PROPER LAND TREATMENT OF PETROLEUM PRODUCT CONTAMINATED SOILS

Article 33-20 of the North Dakota Administrative Code regulates the operation and construction of municipal waste landfills, inert waste landfills and industrial waste landfills. In response to numerous requests for guidance and information on proper treatment of petroleum contaminated soils, the Department has prepared these guidelines. Petroleum contaminated soils are not routinely allowed into municipal waste landfills. Any transport, storage or treatment of such materials in regulated landfills or anywhere in the State must be properly coordinated and approved by the Department.

It is important to remember that land treatment activities use unlined surface soils which are subject to direct contaminant losses via air, water or food chain; consequently, facility management has a substantial impact on both the treatment effectiveness and the potential for contamination. Improperly designed or managed land treatment units could cause various types of human health problems or environmental damage. Land treatment relies on volatilization and soil microorganisms to breakdown or "eat" the contaminants. Soil microorganisms, abundant in topsoil, require warmth, nutrients, moisture, and air (tillage) to actively breakdown oil-based contaminants. As appropriate, a culture of microorganisms and nutrients may be added to the soil to facilitate the breakdown processes.

Disposal/Treatment Practices for Petroleum Contaminated Soils

1. Contaminated soils shall be treated only at properly operated, geologically suitable landfills as approved by the Department. (The Department maintains a list of such sites.) At their discretion, owners/operators of landfills can refuse contaminated soil.

2. As little degradation occurs during the cold months, it is prudent to stockpile contaminated soils until the growing season. The stockpile area should be constructed to be as small as practical and to control surface water runoff and run-on.

3. A nearly level to gently sloping area of the landfill where soil will be undisturbed for several months should be selected. This can be a reclaimed area, closed area, or area yet to be landfilled. Soils need to be clayey with a topsoil layer present or topsoil added.

4. Surface water controls are necessary around storage and treatment areas. These controls must be adequate to control

runoff/run-on at the site. Ditches or berms upslope of the site should divert water inflow around and away from the treatment area. Berms, ditches, or impoundments downslope at the site must be adequate to contain and store surface water runoff during heavy precipitation events. Surface water runoff must not be allowed to cause degradation of any off-site streams, rivers, lakes, etc.

5. Prepare the treatment area by tilling to a depth of six inches. Additional nutrients (fertilizer) may be required for efficient degradation. Manure can be used. Manure provides nitrogen and organic matter which enhances absorption of the waste constituents. The soil should be tested to determine any fertilizer needs.

6. Contaminated soils should be spread in a uniform layer no thicker than six inches over the area and then tilled into the prepared surface.

7. The disposal facility should plan on allowing at least a 45-day residence time for the soil to be treated at the site. Factors modifying the treatment time period are: season, soil temperature, soil fertility, soil moisture, amount of tilling, degree of contamination, and waste characteristics. Maintaining soil moisture near field capacity is important. The treatment area may require daily irrigation during dry weather.

8. The material should be tilled, at a minimum, once every two weeks until any noticeable odor is no longer present.

9. Properly landfarmed materials may be included in a stockpile for use as final cover for closed portions of the landfill site or the area could be left in place and planted to grass to control erosion.

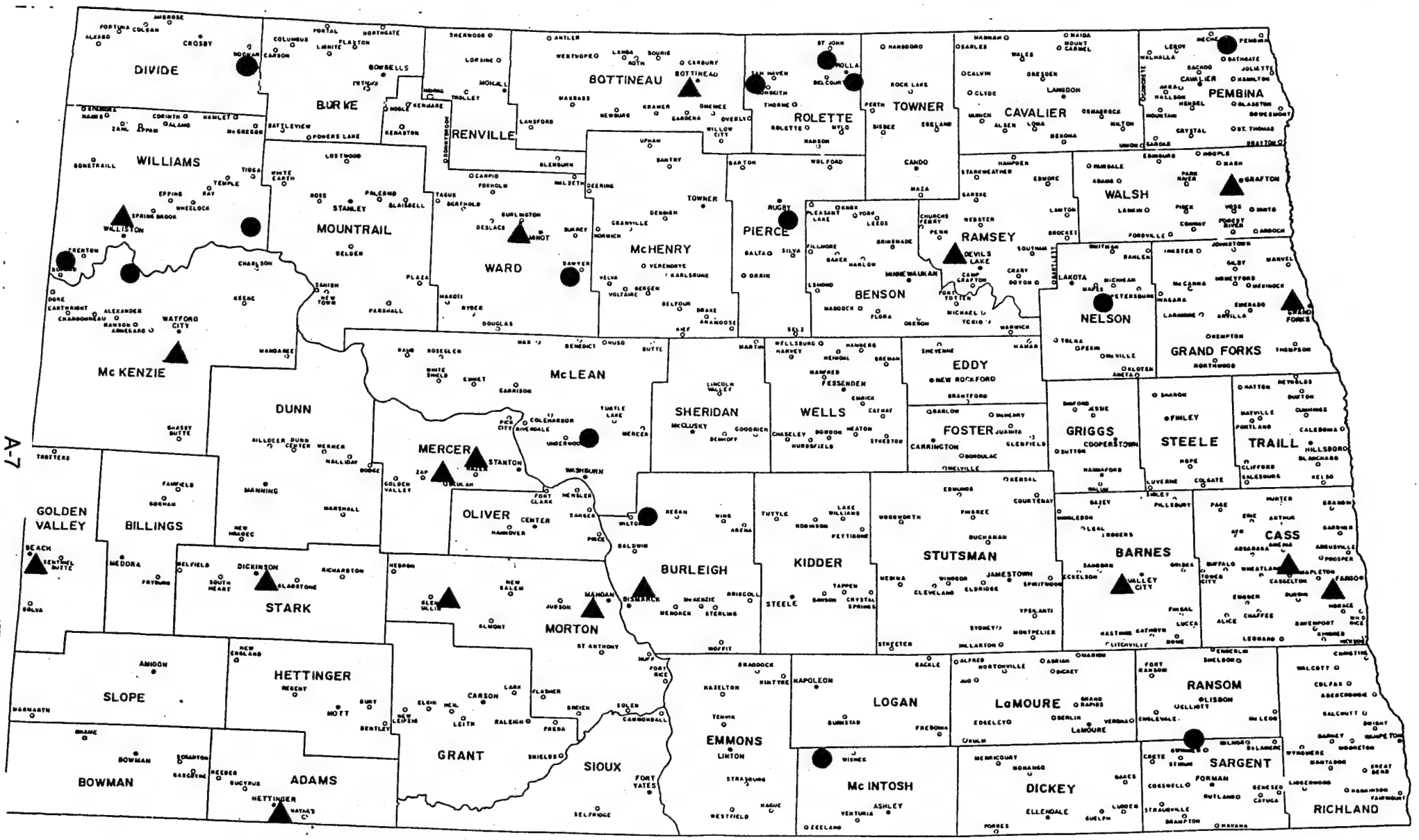
10. Quantities of 20 cubic yards or less containing no free liquids, received in a four week period, that can be spread to less than 1/2-inch thickness may be landspread without tillage. Cumulative quantities in excess of this amount received in the aforementioned time period will be handled as instructed by steps 1-9.

SUITABLE LANDFILL FACILITIES FOR THE TREATMENT OF PETROLEUM PRODUCT CONTAMINATED SOILS

MUNICIPAL WASTE DISPOSAL FACILITIES

PERMIT	NAME	ADDRESS	CITY	STATE	ZIP	COMMENTS
SW-319	ADAMS COUNTY LANDFILL	PO BOX 589	HETTINGER	ND	58639	701-567-2468
SW-329	BAUER, ROBERT	PO BOX 98	WILTON	ND	58579	701-734-8186
SW-013	BEACH	PO BOX 278	BEACH	ND	58621	701-872-4103
SW-276	BEULAH	PO BOX 910	BEULAH	ND	58523-0910	701-873-4637
SW-257	BIG DIPPER	PO BOX 626	WAHPETON	ND	58075	701-642-8920
SW-017	BISMARCK	PO BOX 5503	BISMARCK	ND	58502	701-222-6431
SW-281	BOTTINEAU	115 WEST 6TH ST	BOTTINEAU	ND	58318	701-228-3232
SW-317	CASSELTON (NEW SITE)	PO BOX 548	CASSELTON	ND	58012-0548	701-347-4861
SW-044	DEVILS LAKE	PO BOX 1048	DEVILS LAKE	ND	58301-1048	701-662-4098
SW-315	DICKINSON	PO BOX 1037	DICKINSON	ND	58601-1037	701-264-7746
SW-260	FARGO - RON OLSON, GARBAGE UTILITY	2301 8TH AVE N	FARGO	ND	58102	701-241-2489
SW-065	GLEN ULLIN	PO BOX 70	GLEN ULLIN	ND	58631-0070	701-348-3683
SW-068	GRAFTON	PO BOX 578	GRAFTON	ND	58237	701-352-1561
SW-069	GRAND FORKS	PO BOX 1518	GRAND FORKS	ND	58201	701-775-8103
SW-270	HAZEN	PO BOX 717	HAZEN	ND	58545-0717	701-748-2250
SW-332	JAHNER SANITATION, INC.	PO BOX 397	LINTON	ND	58522	701-254-4533
SW-324	JENSON, HAROLD JR		NECHE	ND	58265	701-886-7440
SW-285	MANDAN (NEW SITE)	203 2ND AVE NW	MANDAN	ND	58554	701-667-3218
SW-326	MCDANIEL LANDFILL	PO BOX 1793	MINOT	ND	58702	701-839-2958
SW-272	MINOT	CIVIC CENTER	MINOT	ND	58701	701-857-4140
SW-333	MISSOURI RIVER SANITATION	PO BOX 1145	WASHBURN	ND	58577	701-462-3740
SW-251	MURPHY SERVICE	PO BOX 104-A, RT 1	ROLLA	ND	58367	701-477-3447
SW-280	MURPHY SERVICE - MURPHY/COLEMAN SITE	PO BOX 104-A, RT 1	ROLLA	ND	58367	701-477-3447
SW-271	MURPHY SERVICE - TURTLE MOUNTAINS SITE	PO BOX 104-A, RT 1	ROLLA	ND	58367	701-477-3447
SW-107	NELSON COUNTY	COURTHOUSE	LAKOTA	ND	58344	701-247-2463
SW-237	NORTHWEST SOLID WASTE MANAGEMENT COUNCIL C/O DICK ROSS	BOX 67	RAY	ND	58849	701-568-2204
SW-144	VALLEY CITY	PO BOX 390	VALLEY CITY	ND	58072-0390	701-845-1700
SW-309	VOLK, CASPER	307 2ND ST SE	RUGBY	ND	58368	
SW-152	WATFORD CITY	PO BOX 494	WATFORD CITY	ND	58854-0494	701-842-2533
SW-303	WILLISTON (NEW SITE)	PO BOX 2437	WILLISTON	ND	58802	
SU-079	DISHON DISPOSAL	ROUTE 3, BOX 64	WILLISTON	ND	58801	
SU-088	HEXOM CONSTRUCTION	ROUTE 3, BOX 238	WILLISTON	ND	58801	
SU-063	PRAIRIE DISPOSAL	1109 2ND AVE E	WILLISTON	ND	58801	

*AT THEIR DISCRETION, OWNERS/OPERATORS OF LANDFILLS MAY REFUSE CONTAMINATED SOIL



DISPOSAL SITES APPROVED FOR ACCEPTING PETROLEUM-CONTAMINATED SOILS

▲ MUNICIPAL FACILITIES

● PRIVATE FACILITIES

NORTH DAKOTA
STATE DEPARTMENT OF HEALTH
AND CONSOLIDATED LABORATORIES

ENVIRONMENTAL HEALTH SECTION

1200 Missouri Avenue
P.O. Box 5520
Bismarck, North Dakota 58502-5520
Fax #701-221-5200

LAND TREATMENT OF PETROLEUM CONTAMINATED SOIL: SINGLE APPLICATION SITES

The North Dakota State Department of Health and Consolidated Laboratories (NDSDHCL) requires that excavated petroleum contaminated soil be treated or disposed of properly. Incorporation of petroleum contaminated soil into the top six inches of native soil can be an effective treatment option. Land treatment of wastes must be approached on a scientific basis and should not be considered as a "black box" for disposal of wastes. Land treatment takes advantage of naturally occurring soil microorganisms to biodegrade petroleum. Some volatilization of petroleum hydrocarbons will also occur during the process.

The Department has generally required that petroleum contaminated soil be treated through land application at existing municipal waste or industrial waste landfills. On a case-by-case basis, the Department will consider allowing treatment at other sites when landfarming at a landfill is not feasible or is too far away. This document outlines suitable site and soil characteristics, land application procedures, soil sampling requirements and necessary approval requirements for sites receiving a single, one-time application of petroleum contaminated soil. On a case-by-case basis, depending on the site capabilities and the waste material, the Department may allow two or three site applications on discrete areas of a single application site; however, appropriate documentation must be provided as outlined herein. Except as provided under this variance, sites in which repeated applications of petroleum contaminated soil are proposed must meet additional conditions.

A form entitled "Application to Land Treat Petroleum Contaminated Soil" is attached and should be completed and submitted to Departmental staff for approval prior to land application at single application sites and approved facilities.

I. BACKGROUND INFORMATION

The following list outlines the minimum information which should be provided to the Department (NDSDHCL) along with the application prior to approval of a proposed site for land application of petroleum contaminated soil.

A. Disposal site location and site location map.
B. Landowner's name, address and telephone number.

Environmental Health Section and Enforcement 701-221-5150
Environmental Engineering 701-221-5188
Municipal Facilities 701-221-5210
Waste Management 701-221-5166
Water Quality 701-221-5210

C. Documentation of approval or notification (providing a reasonable time for response) of the appropriate local officials (county, city, or township).
D. Topographic and soil survey maps with the proposed spreading site outlined and a map scale presented.
E. Estimated volume of soil to be landspread.
F. Projected date of spreading.
G. Site and soil characteristics (see below).
H. Proposed land application procedures (see below).
I. Proposed sampling, tillage and reporting schedule (see below).
J. Any previous history of waste disposal activities at the proposed site.
K. Site visit by a qualified environmental consultant.

II. SITE AND SOIL CHARACTERISTICS

This section outlines the recommended site and soil characteristics which should be used to evaluate a site's suitability as a land application site. Exceptions to these criteria may be made by the Department on a site-specific basis. Published soil survey information (available through county Soil Conservation Service offices) provides an excellent reference for some of the necessary site characteristics such as site slope, depth to groundwater, and soil type for most native soils in North Dakota. If specific soil information is not available or if more detailed soil information is required, a Professional Soil Classifier can be utilized to determine site-specific soil conditions. Soil borings or trenching, or a hydrogeologic evaluation, may be required to evaluate the proposed land application site.

Note: Unsuitable land application sites include closed fill areas of former waste disposal sites (e.g., landfills), gravel pits, quarries, and 10-year floodplains. Areas with highly permeable soils or areas that are excessively steep should also not be considered.

A. Site slope: 6 percent maximum.
B. Minimum distance to surface water: 100 feet.
C. Minimum distance to residences or buildings: site specific, in general 200 feet.
D. Minimum depth of 5 feet to seasonal high water table for most soils.
E. Soil characteristics:

1. Permeability: slow to moderate, less than 2 inches per hour. Areas underlain by highly permeable soils, very slowly permeable soils, or sodium affected soils should be avoided.

2. pH: minimum pH of 6.5, neutral or slightly alkaline preferred.

3. Nutrients: soils with moderate to high levels of fertility are preferred.

4. Well cultivated and fertilized fields are desirable.

5. Optimum soil moisture content is 50-70 percent of the soil water holding capacity.

Soil nutrient tests and/or fertilizer addition should be completed for fields with low fertility (e.g., low organic matter, eroded, or disturbed soils) and/or depending on the contamination level of the soils and the thickness the soil is to be spread. Information on soil organic matter content provides a general indicator of both soil nitrogen and sulfur supply. Extractable phosphorus indicates soil phosphorus supply. Minimum generally acceptable levels for these parameters are:

- Organic matter concentration: 2.0 percent
- Extractable phosphorus: 20 milligrams per kilogram

For soil analysis results below these levels, nutrients should be applied in accordance with the following table:

Soil Contaminant Concentration	Pounds/Acre Fertilizer to Apply		
	Nitrogen	Sulfur	Phosphorus (P_2O_5)
1000 ppm Total Hydrocarbons	30	20	40
2000 ppm Total Hydrocarbons	60	40	80
3000 ppm Total Hydrocarbons	90	60	120
4000 ppm Total Hydrocarbons (or greater)	120	80	120

NOTE: Table assumes 4-inch spreading thickness; reduce rates accordingly for lower spreading thicknesses. Fertilizer rates should not exceed 120 pounds nitrogen/acre, 80 pounds sulfur/acre, and 120 pounds P_2O_5/acre.

III. LAND APPLICATION PROCEDURES

Acceptable procedures for land application are outlined below. The Department will consider exceptions on a site-specific basis.

A. Contaminated soil should be spread only when the land is tillable, but no earlier than April 1 and no later than November 1. If contaminated soil is to be stockpiled, it should be in an area where surface water run-on and runoff is controlled.

B. As appropriate, surface water controls must be utilized around storage and treatment areas so that water run-on and runoff is controlled. Surface water runoff must not be allowed to cause degradation of any off-site streams, rivers, wetlands, lakes, etc. Ditches and berms upslope of the site should divert water inflow around and away

from the treatment area. Berms, ditches, or impoundments downslope of the site may be necessary to contain and store any contaminated runoff during heavy precipitation events.

C. Contaminated soil cannot be applied greater than 4 inches in thickness. The Department may require thinner spreading thicknesses on a site-specific basis. Corresponding soil application rates for suitable spreading thicknesses are as follows:

1. 530 cubic yards/acre at 4-inch spreading thickness
2. 400 cubic yards/acre at 3-inch spreading thickness
3. 270 cubic yards/acre at 2-inch spreading thickness
4. 135 cubic yards/acre at 1-inch spreading thickness

(1 cubic yard = 27 cubic feet, 1 acre = 43,560 sq. ft.)

The petroleum loading rate should not exceed approximately 2 percent or 20,000 parts per million (ppm) total petroleum hydrocarbons as fuel oil or gasoline in the soil to be land applied. This corresponds to approximately 67 barrels (2800) gallons per acre for soil spread 4 inches thick contaminated with a relatively heavy oil.

D. The method of spreading the contaminated soil (dozer, grader, spreader, etc.) should be specified.

E. Land applied soil should be incorporated (mixed) with the upper 4 to 6 inches of native soil within 48 hours after application. Fertilizers should be broadcast either just before or just after soil spreading, but prior to incorporation. Nutrients should be added as necessary to maintain an optimum C:N:P:S ratio of 50:2:1:1.

F. To enhance hydrocarbon breakdown, the soil should be disked monthly during the land application season. Less frequent tillage may not provide adequate aeration and mixing and, therefore, may slow hydrocarbon breakdown. More frequent tillage could be done if soil moisture is adequate, soil compaction is not a problem, and wind erosion can be controlled.

For fields where petroleum contaminated soil is land applied prior to July 1, tillage may not be required in subsequent years. However, soil monitoring shall continue until contamination is below acceptable levels, as outlined in Part IV.C. For land applications after July 1, a minimum of six monthly tillage operations will be required (excluding the period from November 1 to April 1), unless soil monitoring results are below the acceptable levels (Part IV.C).

G. Depending on site conditions, the operation, climatic conditions and other factors, measures to control soil

moisture and wind erosion as well as to improve the bacterial culture of the soil may be needed. If the soils are excessively dry, the addition of moisture to the site may be necessary (ponded surface runoff water could be used). More frequent tillage or site drainage may be necessary if the site is too wet. The incorporation of straw or mulch is advised to help control wind erosion and improve soil aeration. If the soil is deficient in humus (organic material) and/or oil degrading soil bacteria, the addition of innoculants, rotted manure, mature compost, or rich topsoil is advised.

IV. SOIL SAMPLING REQUIREMENTS

A. Contaminated stockpiled soil: Soil samples must be taken to evaluate and document the contamination levels in the soil to be treated. Soil samples should be composite samples. Dig a minimum of 1 foot into the pile at least three places within the pile before collecting the samples. To avoid cross-contamination, samples should be taken using clean disposable gloves (and other clean sampling utensils) at each sample location [refer to NDSDHCL "Procedures for Collection of Soil Samples at UST Sites"]. Mix equal portions of each sample before sealing the sample container. Completely fill each sample vial so that no headspace exists, wipe soil from the vial threads, and seal the vial using a cap with a teflon septum. Label the vial, wrap it in aluminum foil, and place in a covered cooler with ice for transport to a laboratory for analysis.

The number of soil samples should be based on the following table:

Volume of Soil (cubic yards)	Number of Samples
<10	0
10-50	1
50-500	2
500-1000	3
1000-2000	4
2000-4000	5
Each additional 2000	One additional sample

Soil samples should be analyzed for total petroleum hydrocarbons as fuel oil or gasoline, lead (for leaded gasoline or any lead-bearing petroleum hydrocarbon, required once per sample prior to application) and pH. Other analysis such as benzene, ethyl benzene, toluene and xylenes may be necessary depending on site conditions or depending upon the product involved.

B. Land application site soil nutrient level determination: If the fertility status of the proposed land application site must be evaluated (see Part II), several representative soil samples from the top six inches of native soil should be taken. These samples should be handled and prepared for analysis in accordance with the procedures recommended by the soil testing laboratory to be used.

Samples should be analyzed for organic matter (using loss on ignition methodology), extractable phosphorus (Bray-1 method for soil pH 7.4 or less; Olsen's phosphorus method for soil pH greater than 7.4), and soil pH (to determine appropriate phosphorus method).

C. Follow-up monitoring: To assess and document hydrocarbon breakdown, follow-up soil samples must be taken. These samples should be taken from a depth of 4-6 inches (using the sampling methods discussed in Part IV.A above). The number of grab samples to be taken at each sampling interval should follow the table in Part IV.A and should adequately represent the entire land treatment area. Samples need only be analyzed for total petroleum hydrocarbons; however, the Department may require sampling for additional constituents under some circumstances.

During the year of land application, samples shall be taken at the times specified below until soil analytical results are 10 ppm total petroleum hydrocarbons or less.

Land Application Date	Soil Sampling in 1st Year
Before July 1	Once in August & once in October
July 1 to September 15	Once in October
After September 15	None

Sampling in subsequent treatment years shall include three samples taken approximately in June, August and October, unless results are below 10 ppm total petroleum hydrocarbons.

Refer to the document "Soil Monitoring Results for Land-Applied Petroleum Contaminated Soil" for reporting results.

V. SUBMITTAL AND APPROVAL PROCESS

The attached form "Application to Land Apply Petroleum Contaminated Soil" should be completed and submitted with the required maps, diagrams and information to the Department. Arrangements should be made with appropriate Departmental staff for a site inspection. The site inspection will be done by either Departmental staff, by an individual authorized by the Department (e.g., some local government officials), or by a qualified environmental consultant whose evaluation is subject to Departmental review and approval. If approved, the inspector will sign and date the application form. On a site-specific basis, a site inspection may not be required.

APPLICATION TO LAND TREAT PETROLEUM CONTAMINATED SOIL

Please refer to the Departmental guideline document "Land Treatment of Petroleum Contaminated Soil: Single Application Sites" for specific information on acceptable soil and site criteria.

I. BACKGROUND INFORMATION

A. Tank owner/operator mailing address: _____

_____

Contact: _____

Company name: _____

Street/Box: _____

City, Zip: _____

Telephone: _____

B. Site from which contaminated soil originated: _____

_____

Company name: _____

Street: _____

City, Zip: _____

County: _____

C. Address or legal description of land spreading site: _____

_____

Contact: _____

Street: _____

City, Zip: _____

Telephone: _____

_____ 1/4 of _____ 1/4 of Section _____, Township _____, Range _____ Township Name _____

D. Consultant (or other) preparing this form: _____

_____

Contact: _____

Company name: _____

Street/Box: _____

City, Zip: _____

Telephone: _____

E. Facility ID number: _____ (FOR STATE USE ONLY)

F. Estimated volume of soil to be land applied (cu.yds.): _____

G. Projected date of application of soil: _____

H. Have there been past waste disposal activities at the proposed site? No ☐ Yes ☐, please explain: _____

II. SITE AND SOIL CHARACTERISTICS

A. Site slope (percent): _____

B. Distance to surface water (feet or miles): _____

C. Distance to nearest building or residence (feet): _____

D. Depth to seasonal high water table (feet): _____

Depth to field tile lines (feet): _____

If bedrock exists at 8 feet or less, indicate depth (ft.) _____

E. Area of land to be used (square feet or acres): _____

F. Spreading thickness (inches): _____

III. SOIL SAMPLING RESULTS

A. If soil nutrient tests were conducted, list the results below:

Sample Number	Organic Matter (Percent)	Extractable Phosphorus (ppm)
_____	_____	_____
_____	_____	_____
_____	_____	_____

If fertilizers will be applied, provide application rates:

___lbs. nitrogen/acre; ___lbs. P_2O_5/acre; ____lbs. sulfur/acre

B. Check the type(s) of petroleum contamination:

Unleaded gas ☐ No. 2 fuel oil ☐
Regular gas ☐ Waste oil ☐
Diesel fuel ☐ Other (please specify): _____

List the appropriate soil sample analytical results from the excavated contaminated soil (refer to the Departmental document "Land Treatement of Petroleum Contaminated Soil: Single Application Sites"). If the petroleum was not gasoline or fuel oil, attach a separate table.

		Waste/Used Oil Contaminated Soils				
Sample Number	TPH as gas or FO (ppm)	Benzene (ppm)	Chromium (ppm)	Lead (ppm)	TOX (ppm)	Ignitability (free liquids)
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

IV. FIGURES

Include the following figures:

A. Copy of county soil survey map (if the county has been mapped) or other appropriate soil details with copies of the interpretation sheets.
B. Site location map with exact application location marked (scale should be approximately 1 inch = 50 feet).

****

Signature and title of staff inspector (or other authorized inspector: _____ Date inspected: _____

Signature and title of county official:_____

Signature and title of city/township official: _____

****

Mail to: ND State Dept. of Health & Consolidated Laboratories
Waste Management Division
1200 Missouri Ave. - PO Box 5520
Bismarck, ND 58502-5520

SOIL MONITORING RESULTS FOR
LAND-TREATED PETROLEUM CONTAMINATED SOIL

This form should be used for reporting the results of follow-up soil sampling where petroleum contaminated soil has been land applied. Refer to the North Dakota State Department of Health and Consolidated Laboratories' document "Land Treatment of Petroleum Contaminated Soil: Single Application Sites" for specific information on soil sampling.

A. Tank owner/operator: _____

Petroleum release site: _____

Facility ID number: _____ (FOR STATE USE ONLY)

B. Address or legal description of land application site:

Street: _____ City: _____

___ 1/4 of ____ 1/4 of Section ____, Township ____, Range ____

C. Consultant (or other) preparing this form: _____

Contact: _____ Phone: _____

D. Dates that tillage was done (since land application or the most recent monitoring report): _____ _____ _____

Address: _____ City: _____ Phone: _____

Name of operator or firm responsible for tillage: _____

_____

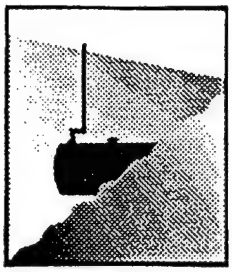
Soil sampling date: _____

List the soil sample analytical results from the land application site. Use parts per million (ppm) units.

Sample Number	Total Hydrocarbons as Gas or Fuel Oil (ppm)	Sample Number	Total Hydrocarbons as Gas or Fuel Oil (ppm)
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

NOTE: ATTACH COPIES OF LABORATORY RESULTS & CHAIN OF CUSTODY FORMS

Mail to: ND State Dept. of Health & Consolidated Laboratories
Div. of Waste Management
1200 Missouri Ave. - PO Box 5520
Bismarck, ND 58502-5520



PROCEDURES FOR THE COLLECTION OF SOIL SAMPLES AT UST SITES

This document provides general guidance for the collection of soil samples contaminated by gasoline or other petroleum hydrocarbons at underground storage tank sites. Petroleum underground storage tanks are regulated by the North Dakota Underground Storage Tank (UST) Rules-Chapter 33-24-08 of NDAC Article 33-24.

I. GENERAL PROCEDURES

The locations of surface soil samples, soil borings, and excavation areas should be identified and documented on a site map. Soil boring logs should be prepared by qualified personnel (e.g. geologist, engineer etc.) and be included along with the site map, in a Site Investigation Report. The appropriate method for obtaining a soil sample is determined by site conditions. Soil samples can be obtained using the following methods:

* hand auger, trowel or spatula for collecting surface samples and composite samples of stockpiled soils;
* split spoon sampler when drilling well boreholes and constructing depth profiles; and
* backhoe for collecting samples from the UST excavation area.

II. SURFACE SAMPLING

All soil sampling equipment must be decontaminated prior to each use. A shovel, trowel or scoop can be used for sample collection of surface soils. Soil samples taken at depths greater than 3 inches should be collected with a hand auger or a tube sampler. Stainless steel sampling equipment should be used whenever possible.

III. SUBSURFACE SAMPLING

Borings for subsurface sampling should be advanced with a hollow-stem, continuous flight auger. Other drilling methods may be used as dictated by site specific conditions and approved in advance by the North Dakota State Department of Health and Consolidated Laboratories.

Soil samples should be obtained using a split spoon sampler. The sampling method as prescribed by ASTM:D 1586-84 may be used. Samples should, at a minimum, be taken every five feet or as often as necessary to accurately describe the stratigraphy and any zones of contamination. The sampling device should be decontaminated between each sampling event.

IV. SOIL SAMPLES

The labels on the soil sample containers should indicate the following:

* Type of analysis;
* Name of facility;

* Sampling point identification;
* Name of person collecting the sample; and
* Time and date the sample was collected.

Chain of custody tracking must be done for all samples. Chain of custody provides a record of all the personnel responsible for handling the samples. A log should be kept of all sampling activities.

REGULATORY AGENCY

North Dakota State Department of Health
& Consolidated Laboratories
Division of Waste Management
1200 Missouri Avenue
P.O. Box 5520
Bismarck, North Dakota 58502-5520

North Dakota State Department of Health and Consolidated Laboratories
Division of Waste Management

GUIDELINES FOR THE DISPOSAL OF TANK SLUDGE

Underground Storage Tank (UST) Wastes

This document provides guidelines for the disposal of wastes which are generated from the cleaning of underground storage tanks. It is intended to provide the necessary information to tank owners and tank removal contractors so that each type of waste is tested, treated and disposed in accordance with the North Dakota Underground Storage Tank Rules, Hazardous Waste Management Rules and Solid Waste Management Rules.

Please note that the wastes from USTs may be classified as regulated hazardous wastes if these wastes exhibit certain characteristics. These characteristics are discussed in the following sections of this document. If, after testing these wastes, they are determined to meet the criteria of a characteristic hazardous waste, they must be stored, handled and disposed in accordance with the North Dakota Hazardous Waste Management Rules. For information regarding these Rules contact the Division of Waste Management - Hazardous Waste Program (701-221-5166).

Petroleum USTs (Gasoline, Diesel and Fuel Oil Products)

I. Petroleum product.

Usable petroleum products should be removed from the USTs and sold or reused as products.

II. Petroleum tanks (USTs).

A. All USTs which are excavated or closed in-place must be empty and cleaned by removing all liquids and accumulated sludges. NOTE: the following cleaning and closure procedures may be used to comply with this requirement.

1. American Petroleum Institute Recommended Practice 1604, "Removal and Disposal of Used Underground Petroleum Storage Tanks;"

2. American Petroleum Institute Publication 2015, "Cleaning Petroleum Storage Tanks;"

3. American Petroleum Institute Recommended Practice 1631, "Interior Lining of Underground Storage Tanks" may be used as guidance for compliance with this requirement; and

4. The National Institute for Occupational Safety and Health "Criteria for a Recommended Standard***Working in Confined Space" may be used as guidance for conducting safe closure procedures at some hazardous substance tanks.

B. All USTs which are excavated or closed in-place should be "opened" in a manner as specified in the above referenced industry codes and recommended practices. If an excavated tank is to be used for private, noncommercial above ground storage of a petroleum product, the UST

owner/operator should contact the State Fire Marshal's Office (701-224-2434) for recommendations on proper installation and siting.

CAUTION: Under no circumstances should tanks which previously contained leaded gasoline be used for the subsequent storage of foods or liquids intended for animal or human consumption.

C. Once opened, all sludge, scale and waste product must be removed from the UST and accumulated in a tank or container which is in compliance with the North Dakota Hazardous Waste Management Rules. A 55-gallon drum in good condition may meet the definition of a container (see the section below regarding "Wastes Contained in Petroleum USTs").

D. It is recommended that all USTs be thoroughly cleaned using a suitable cleaning device such as a high pressure steam cleaner. The rinsate generated by this step can be containerized or passed through an oil-water separator. The water from the separator can be discharged to a municipal sanitary sewer or directly to a municipal waste treatment pond after obtaining permission from the appropriate state and/or local official(s).

E. If the UST is to be disposed of, it must be cut into pieces of a size approved by the landfill operator who has agreed to accept the waste steel. Permission from the owner/operator of the landfill is advised before an UST is delivered for disposal. As an alternative to disposal, steel tanks may be sold as scrap following proper cleaning and decontamination.

III. Wastes contained in petroleum USTs (see Charts 1 and 2).

A. All sludge, scale, waste product and rinsate generated as a result of cleaning the inside of petroleum USTs must be containerized separately in 55-gallon steel drums at the cleaning site. Each drum should be filled not more than one-third (1/3) full and be properly identified and/or labeled. Any rinsate from washing the tank may be discharged in the manner as described in Section II.D, above.

B. If the <u>total</u> amount of the petroleum UST waste is GREATER than 220 lbs. (approximately 22 gallons - see Chart 2), samples must be taken from each waste type (sludge, scale, waste product and rinsate) and either combined into a single composite sample and analyzed or analyzed separately by the following chemical testing procedure:

Table 1.
Petroleum USTs - Testing Procedure

Characteristic	Regulatory Limit
Benzene*	0.5 mg/l
Lead*	5.0 mg/l
Flash point (free liquids)	140°F

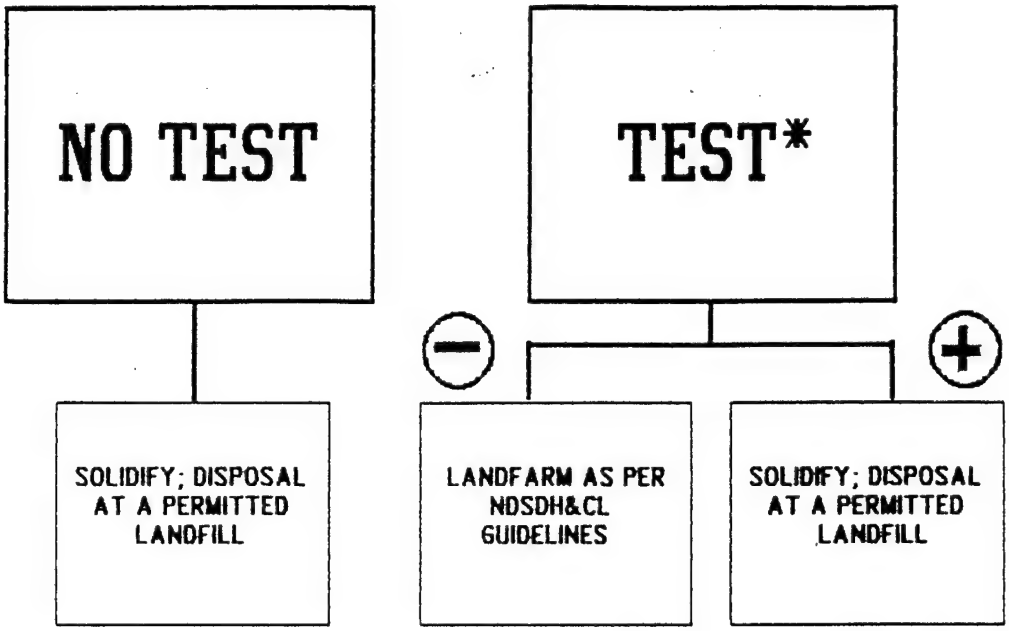
*Must prepare sample using TC Leaching Procedure.

Chart 1. Petroleum USTs/Used Oil USTs

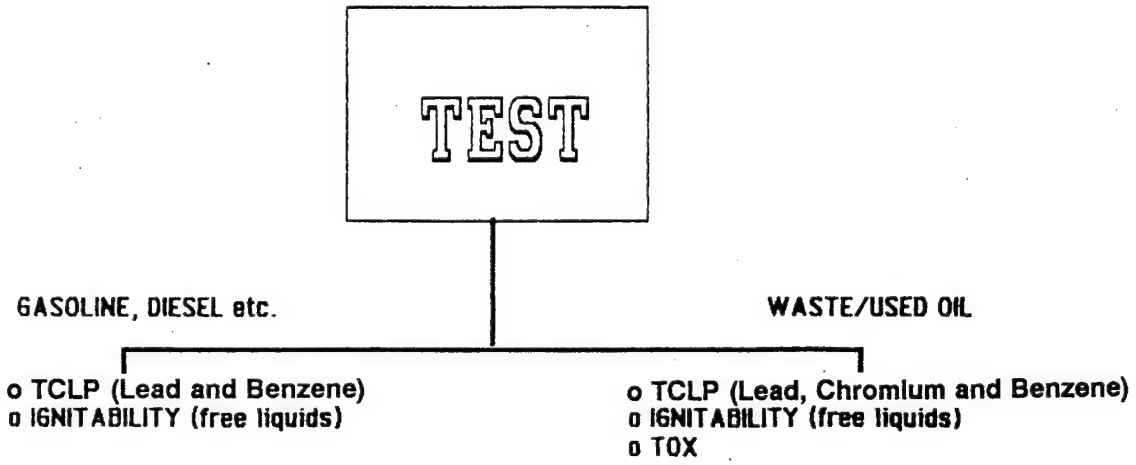
SLUDGE
SCALE
WASTE/USED OIL-CONTAMINATED SOIL
RINSATE

Containerized separately in 55-Gallon Drums (not more than 1/3 Full)

LESS THAN 220 lbs. (22 gallons)



* TEST PARAMETERS



C. If the results from this chemical testing indicates the petroleum UST waste is nonhazardous (i.e., the analytical parameters are within regulatory limits), the waste may be solidified in preparation for disposal at a State-permitted landfill or treated in a manner consistent with the Department's "Guidelines for Proper Land Treatment of Petroleum Product Contaminated Soils" (contact the Department for a copy of this guidance document). If solidified, the waste in each accumulation drum should be mixed in a 1:1 ratio with a solidifying agent such as Portland cement, fly ash or cement kiln dust. The waste in each drum should be thoroughly mixed so that the solidified waste is homogeneous. The resulting waste must have no free liquids as measured by the Paint Filter Liquids Test (SW-846 Method 9095, provided as Attachment 1 to this guidance document).

D. If the chemical testing of the petroleum UST waste indicates that the waste exhibits hazardous characteristics, the waste owner must manage the waste as a regulated hazardous waste. For requirements on the proper handling, storage and disposal of this material, the owner should contact the Division of Waste Management - Hazardous Waste Program.

E. If the <u>total</u> amount of petroleum UST waste is LESS than 220 lbs. (approximately 22 gallons - see Chart 1), the waste owner has two options for disposal or treatment of the waste. These are:

1. The waste may be solidified in preparation for disposal at a State-permitted landfill. The waste in each accumulation drum should be mixed in a 1:1 ratio with a solidifying agent such as Portland cement, fly ash or cement kiln dust. The waste in each drum should be thoroughly mixed so that the solidified waste is homogeneous. The resulting waste must have no free liquids as measured by the Paint Filter Liquids Test (SW-846 Method 9095, provided as Attachment 1 to this guidance document).

2. Samples may be taken from each waste type (sludge, scale, waste product and rinsate) and either combined into a single composite sample and analyzed or analyzed separately by the chemical testing procedure as described in Table 1. If the results from this chemical testing indicate that the petroleum UST waste is nonhazardous (i.e., the analytical parameters are within regulatory limits), the waste may be treated in a manner consistent with the Department's "Guidelines for Proper Land Treatment of Petroleum Product Contaminated Soils" (contact the Department for a copy of this guidance document). If the chemical testing of the petroleum UST waste indicates that the waste exhibits hazardous characteristics, the waste owner may solidify the waste in preparation for disposal at a State-permitted landfill as described in option 1 above.

   Permission from the owner/operator of the landfill facility is advised before any petroleum UST wastes are delivered for treatment <u>or</u> disposal.

Waste/Used Oil USTs

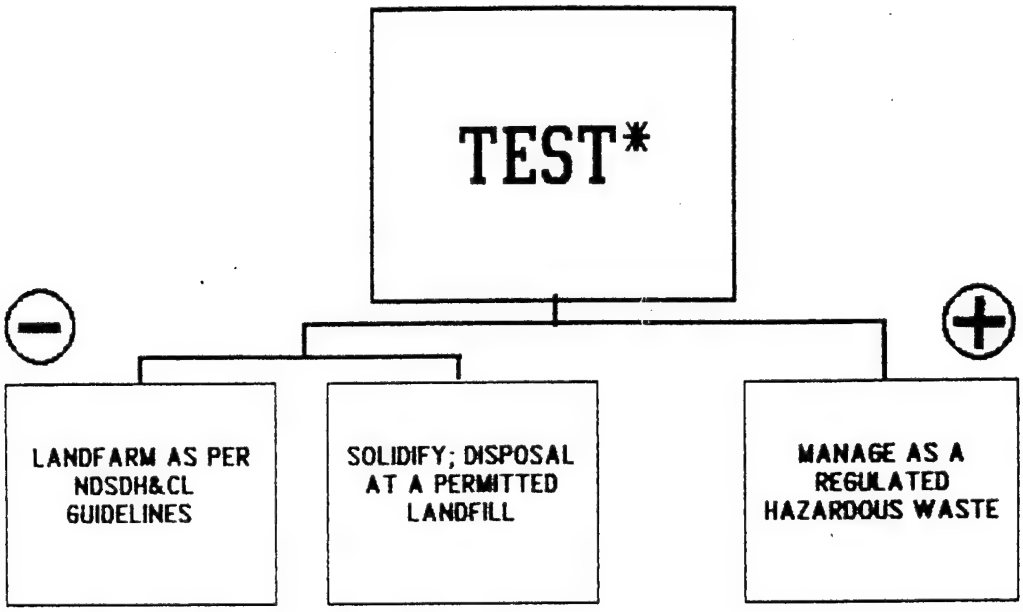
I. Recyclable used oil.

Chart 2. Petroleum USTs/Used Oil USTs

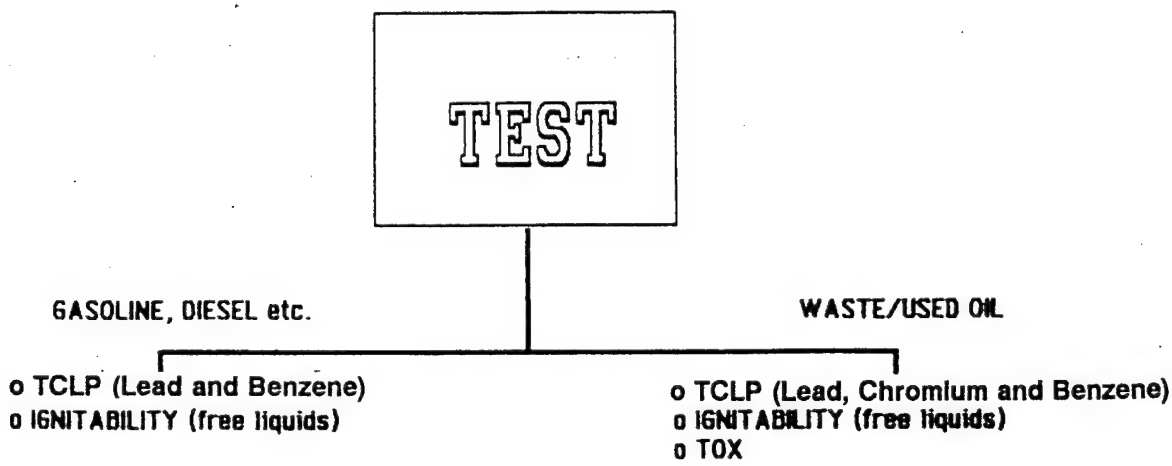
SLUDGE
SCALE
WASTE/USED OIL-CONTAMINATED SOIL
RINSATE

Containerized separately in 55-Gallon Drums (not more than 1/3 Full)

GREATER THAN 220 lbs. (22 gallons)



* TEST PARAMETERS



Recyclable waste/used oil should be delivered to a waste/used oil reclaimer for recycling (contact the Department for a list of names of waste/used oil reclaimers).

II. Waste/used oil tanks (USTs).

Waste/used oil USTs should be cleaned by the same procedure which is used for petroleum tanks, as described above in Section II. - Petroleum tanks (USTs).

III. Wastes contained in waste/used oil USTs (see Charts 1 and 2).

A. All sludge, scale, waste product and rinsate generated as a result of cleaning the inside of waste/used oil USTs must be containerized separately in 55-gallon steel drums at the cleaning site. Each drum should be filled not more than one third (1/3) full and be properly identified and/or labeled. Any rinsate from washing the tank may be discharged in the same manner as described above for petroleum tanks - Section II.D.

B. If the <u>total</u> amount of the waste/used oil UST waste is GREATER than 220 lbs. (approximately 22 gallons - see Chart 2), samples must be taken from each waste type (sludge, scale, waste product or rinsate) and either combined into a single composite sample and analyzed or analyzed separately by the following chemical testing procedures:

Table 2.
Waste/Used Oil USTs - Testing Procedures

Characteristic	Regulatory Limit
Benzene*	0.5 mg/l
Chromium*	5.0 mg/l
Lead*	5.0 mg/l
TOX (Total Organic Halogens)	1000.0 mg/l
Flash point (Free Liquids)	140°F

*Must prepare sample using TC Leaching procedures

C. If the results from this chemical testing indicates that the waste/used oil UST waste is nonhazardous (i.e., the analytical parameters are within regulatory limits), the waste may be solidified in preparation for disposal at a State-permitted landfill or treated in a manner consistent with the Department's "Guidelines for Proper Land Treatment of Petroleum Product Contaminated Soils" (contact the Department for a copy of this guidance document). If solidified, the waste in each accumulation drum should be mixed in a 1:1 ratio with a solidifying agent such as Portland cement, fly ash or cement kiln dust. The waste in each drum should be thoroughly mixed so that solidified waste is homogeneous. The resulting waste must have no free liquids as measured by the Paint Filter Liquids Test (SW-846 Method 9095 provided as Attachment 1 to this guidance document).

D. If the chemical testing of the waste/used oil UST waste indicates that the waste exhibits hazardous characteristics, the waste owner must manage the waste as a regulated hazardous waste. For requirements on the proper handling, storage and disposal of this material, the owner should contact the Division of Waste Management - Hazardous Waste Program.

E. If the <u>total</u> amount of the waste/used oil UST waste is LESS than 220 lbs. (approximately 22 gallons - see Chart 1), the waste owner has two options for disposal or treatment of the waste. These are:

1. The waste may be solidified in preparation for disposal at a State-permitted landfill. The waste in each accumulation drum should be mixed in a 1:1 ratio with a solidifying agent such as Portland cement, fly ash or cement kiln dust. The waste in each drum should be thoroughly mixed so that solidified waste is homogeneous. The resulting waste must have no free liquids as measured by the Paint Filter Liquids Test (SW-846 Method 9095 provided as Attachment 1 to this guidance document).

2. Samples may be taken from each waste type (sludge, scale, waste product and rinsate) and either combined into a single composite sample and analyzed or analyzed separately by the chemical testing procedure as described in Table 2. If the results from this chemical testing indicates that the waste/used oil UST waste is nonhazardous (i.e. the analytical parameters are within regulatory limits), the waste may be treated in a manner consistent with the Department's "Guidelines for Proper Land Treatment of Petroleum Product Contaminated Soils" (contact the Department for a copy of this guidance document). If the chemical testing of the waste/used oil UST waste indicates the waste exhibits hazardous characteristics, the waste owner may solidify the waste in preparation for disposal at a State-permitted landfill as described in option 1 above.

   Permission from the owner/operator of the landfill facility is advised before any waste/used oil UST wastes are delivered for treatment <u>or</u> disposal.

IV. Contaminated Soils from Waste/Used Oil USTs(see Charts 1 and 2).

A. All soil contaminated by waste/used oil should be stockpiled at the excavation site or tank cleaning site. The contaminated soils must be stockpiled in a bermed area which is lined with an impermeable material such as plastic sheeting or concrete. The stockpile of contaminated soils must be properly identified and/or labeled.

B. The stockpile of contaminated soils should be sampled and tested using the Paint Filter Liquids Test and the chemical testing procedure described in III.B of this section ("Wastes Contained in Waste/Used Oil USTs"). The same testing procedures (i.e., TC Leaching Procedures, etc.) should be used to determine if the soils are suitable for disposal at a permitted landfill. PLEASE NOTE THAT THIS CHEMICAL TESTING PROCEDURE IS REQUIRED FOR ANY VOLUME OF WASTE/USED OIL - CONTAMINATED SOIL IN EXCESS OF 220 LBS.

C. All contaminated soils which pass the chemical testing and the Paint Filter Liquids Test can be delivered to a Department approved landfill for treatment in a manner consistent with the Department's "Guidelines for Proper Land Treatment of Petroleum Product Contaminated Soils" (contact the Department for a copy of this guidance document); permission from the owner/operator of the landfill facility is advised before any contaminated soil is delivered for treatment.

D. All contaminated soils which pass the chemical testing, but fail the Paint Filter Liquids Test, must be allowed to drain until they can pass test. Alternatively, the soils may be mixed with a sufficient volume of dry, uncontaminated soil to absorb the free liquids.

1. All liquids which drained from the contaminated soils must be collected, containerized, analyzed and disposed as outlined in the Section above regarding "Wastes Contained in Waste/Used Oil USTs."

2. Once the contaminated soils pass the Paint Filter Liquids Test, they can be delivered to a Department approved landfill for treatment; permission from the owner/operator of the landfill facility is advised before any contaminated soil is delivered for treatment.

E. If the chemical testing of the waste/used oil - contaminated soil indicates that the soil exhibits hazardous characteristics, the waste owner must manage the waste as a regulated hazardous waste.

1. All soils which failed the chemical testing and which cumulatively amount to less than 220 lbs. (see Chart 1), may be mixed with an appropriate solidification agent such as Portland cement, fly ash or cement kiln dust and delivered to a Department approved landfill for disposal. The solidification agent should be mixed with the soil at a 1:1 ratio. The resulting solidified waste must pass the Paint Filter Liquids Test before it will be authorized for disposal at a permitted municipal or industrial landfill.

2. All soils which failed the chemical testing and which cumulatively amount to more than 220 lbs. (see chart 2), will need to be stored, manifested, and shipped to a hazardous waste management facility which is approved to handle RCRA wastes. In this case, the waste generator should contact the Division of Waste Management - Hazardous Waste Program for further information. NOTE: variations in the procedures outlined above must receive Departmental approval BEFORE excavation of the UST begins.

Regulatory Agency

ND State Department of Health and Consolidated Laboratories
Division of Waste Management
1200 Missouri Avenue
P. O. Box 5520
Bismarck, ND 58502-5520
(701) 221-5166

NORTH DAKOTA
STATE DEPARTMENT OF HEALTH
AND CONSOLIDATED LABORATORIES

ENVIRONMENTAL HEALTH SECTION

1200 Missouri Avenue
P.O. Box 5520
Bismarck, North Dakota 58502-5520
Fax #701-221-5200

GUIDELINES FOR THE LABORATORY ANALYSIS OF SAMPLES FROM PETROLEUM RELEASE SITES

Field screening for hydrocarbon vapors at a petroleum release site provides enough information to determine the presence of contamination and the relative concentration. In many cases, screening information may be sufficient for decision-making purposes, for example, when there is no uncertainty about the type of contaminant (i.e., the source is from a known spill or identified leaking tank). There are instances, however, when laboratory analyses may be desired during an investigation. For example, analytical data from a laboratory may be used for the following reasons:

1. To determine if a potable water supply has been affected and the need for an alternative water source;

2. To identify contaminants that cannot be detected (or differentiated) by field screening techniques; and

3. To meet state and local requirements (e.g., verification of a cleanup, site investigation activities etc.).

Given the cost and time associated with laboratory analyses, it is important that certain measures are taken to ensure accurate results. In order to avoid resampling (which results in unnecessary delays and expenses), consultants should be aware of the following common mistakes and possible solutions:

Mistakes	Solutions
Selection of inappropriate type of analysis	Consult with the laboratory and existing guidelines for recommended analyses. See Table 1 for a summary of some common analytical options.
Use of improper container and preservative	Consult with laboratory and use containers that they have approved and/or provided.
Samples unusable due to breakage or cross-contamination	Collect duplicates; place field blank in storage container with samples.
Samples unusable due to improper storage and excessive holding time	Arrange with laboratory ahead of time for analysis to be run as soon as possible after delivery; store samples in ice-filled cooler immediately following collection.
Analytical results indicate improper labeling or sample misidentification	Label samples very carefully in the field and carefully fill out chain of custody forms prior to delivery to the laboratory.

Rev. 2/12/93

I. ANALYTICAL PROCEDURES

Analytical procedures should be consistent with federal and state guidelines.

A summary of potential analytical parameters to be performed on samples taken at petroleum release sites and the corresponding methodology for each parameter are provided in Table 1; the required containers, preservation techniques, and holding times are listed in Table 2.

The following are suggested procedures for the analysis of samples (soil and water) at petroleum release sites. While the use of these procedures is not mandatory, North Dakota State Department of Health & Consolidated Laboratory (NDSDHCL) staff has the option of rejecting any analytical results which are considered incomplete, inadequate, or inaccurate. Proper sampling should include the following elements:

TABLE 1

SUMMARY OF ANALYTICAL PROCEDURES FOR GASOLINE AND DIESEL FUEL PRODUCTS

Substance to be Analyzed	Analytical Method	Instrumentation
1. Gasoline		
a. Benzene, Toluene, Ethylbenzene & Xylene (BTEX), Purgeable Aromatics	EPA 602 (water) EPA 8020 (soil)	GC GC
All Purgeables	EPA 624 (water) EPA 8240 (soil)	GC/MS GC/MS
b. Total Petroleum Hydrocarbons	EPA 418.1 * DHS	IR GC/FID
c. Purgeable Halocarbons	EPA 601 (water) EPA 8010 (soil)	GC GC
All Purgeables	EPA 624 (water) EPA 8240 (soil)	GC/MS GC/MS
d. Base/Neutrals & Acid Extractables	EPA 625 (water) EPA 8276 (soil)	GC/MS GC/MS
2. Diesel		
a. Total Petroleum Hydrocarbons	EPA 418.1 * DHS	IR GC/FID
b. Base/Neutrals & Acid Extractions	EPA 625 (water) EPA 8270 (soil)	GC/MS GC/MS
3. Oil & Grease	EPA 503	Gravimetric (Extraction)

Substance to be Analyzed	Analytical Method	Instrumentation
4. Lead--Total	EPA 239.2 Standard Methods 304	AA AA
5. Chromium	EPA 218.2	AA
6. Ignitability Flash Point	EPA 1010, 1020	AA
7. Total Organic Halogens (TOX)	EPA 9020, 9022 ASTM D808	--

* California Department of Health Services Method

TABLE 2

REQUIRED CONTAINERS, PRESERVATION TECHNIQUES, AND HOLDING TIMES

NAME	CONTAINER	MAXIMUM PRESERVATION	HOLDING TIME
Metals:			
Chromium VI	P,G	Cool, 4°C	24 hours
Mercury	P,G	HNO_3 to pH <2	28 days
Metals, except chromium VI	P,G	HNO_3 to pH <2	6 months
Oil and grease	G	Cool, 4°C, H_2SO_4 to pH <2	28 days
Volatile Organics:			
Concentrated waste samples	8 oz. widemouth glass with Teflon liner	None	14 days
Liquid samples			
No residual chlorine present	2 40 ml vials with Teflon-lined septum caps	4 drops conc. HCl, cool, 4°C	14 days
Residual chlorine present	2 40 ml vials with Teflon-lined septum caps	Collect sample in a 4 oz. soil VOA container which contains 4 drops of 10% sodium thiosulfate. Gently mix sample and transfer to a 40 ml VOA vial that contains 4 drops conc. MCl, cool to 4°C.	14 days
Soil/sediments and sludges	4 oz. (120 ml) widemouth glass with Teflon liner	Cool, 4°C	14 days
Semiviolatile Organics			
Concentrated waste samples	8 oz. widemouth glass with Teflon liner	None	14 days
Liquid samples			
No residual chlorine present	1-gallon or 2½-gallon amber glass with Teflon liner	Cool, 4°C	Samples extracted within 7 days and extracts analyzed within 40 days
Residual chlorine present	1-gallon or 2½-gallon amber glass with Teflon liner	Add 3 ml 10% sodium thiosulfate per gallon, cool, 4°C	Samples must be extracted within 7 days and extracts analyzed within 40 days
Soil/sediments and sludges	8 oz. widemouth glass with Teflon liner	Cool, 4°C	14 days

II. INTERNAL QUALITY CONTROL CHECKS

In order to provide the necessary quality control of samples taken at petroleum release sites, duplicate samples, blind spikes, field blanks, split samples, trip blanks, and background samples should be collected and submitted to a quality assurance laboratory. The work/sample plans should state the type of sample and frequency with which a sample will be taken.

A suggested frequency for the different sample types is noted in the following table:

INTERNAL QA SAMPLING FREQUENCY

Type of Sample	Frequency	Comments
Duplicate*	10% of samples collected, if possible	Aqueous samples
Blind Spike**	When possible, in coordination with the laboratory.	
Field Blank***	One per sampling incident, if appropriate	Aqueous samples
Split Sample****	As appropriate.	
Trip Blank	Two 40-ml vials filled with deionized water/cooler.	Aqueous samples; only if samples are analyzed for organic volatiles.
Background Sample	As appropriate.	Primarily associated with onsite soil samples.

Every effort should be made to assure that representative samples are collected.

* Duplicate samples. (These are independent samples collected at the same sampling location during the same sampling event).

** Blind spike samples (samples resulting from the addition of compounds to samples).

*** Field blanks (these are obtained by running analyte-free deionized water through sample equipment after decontamination, and collecting the water in appropriate containers for analysis.

**** Split sample (the sample is divided into more than one sample container for separate analyses, usually by different laboratories.

GUIDANCE DOCUMENTS

The following guidance documentation should be used and referenced while conducting site investigations or corrective actions.

1. Groundwater Monitoring Well Design & Installation.
2. Decommissioning of Monitoring Wells and Boreholes.
3. Procedures for Headspace Analysis of Gasoline Contaminated Soils.
4. Procedures for the Collection of Soil Samples at UST Sites.
5. North Dakota Underground Storage Tank Rules.
6. Guidelines for the Disposal of Tank Sludge.
7. Guidelines for Proper Land Treatment of Petroleum Product Contaminated Soils.
8. Land Treatment of Petroleum Contaminated Soil: Single Application Sites.
9. Guidelines on Report Format for Site Investigations.

REGULATORY AGENCY

North Dakota State Department of Health &
Consolidated Laboratories
Division of Waste Management
1200 Missouri Avenue, Room 302
P.O. Box 5520
Bismarck, ND 58502-5520

APPENDIX B

SITE SPECIFIC STANDARDS

NORTH DAKOTA
STATE DEPARTMENT OF HEALTH
AND CONSOLIDATED LABORATORIES

ENVIRONMENTAL HEALTH SECTION

1200 Missouri Avenue
P.O. Box 5520
Bismarck, North Dakota 58502-5520
Fax #701-221-5200
TDD #701-224-2068

REF FILE: UST #2021

April 4, 1994

HALEY WIHONGI
HDQTRS ANGRC/CEVR
3500 FETCHET AVE
ANDREWS AFB MD 20331-6008

Dear Ms. Wihongi:

Referencing your phone call of this morning, typically, our Department has representatives present for all underground storage tank (UST) removals in North Dakota. Our Department representative screens the excavated materials for volatiles using a PID. Soils exhibiting meter readings in excess of 100 units are generally removed for treatment.

Applying these procedures to Site 2 at Hector International Airport in Fargo North Dakota, we would expect that you conduct the corrective action procedures as contained in your January 1994 plan. But if field screening of the soils, at the time of removal, would indicate that contamination in excess of 100 meter units extends beyond the two-foot limit of excavation, we would also expect that additional soil be removed back to native soils with meter readings less than 100 meter units. Likewise, if the soils show obvious staining, that soil should be removed as well.

Even though the UST Program does not directly regulate Site 10 (an UST is not involved), it would seem prudent that you follow these same procedures in addition to the corrective action procedures you have detailed in your January 1994 plan. As I explained on the phone, North Dakota has not established a cleanup level specifically for BTEX; cleanup levels are determined on a site-by-site basis. However, provided you follow the above-referenced corrective action procedures, we would consider a BTEX concentration of 40ppm as an acceptable level of soil cleanup, with a Benzene concentration not to exceed 500ppb. (.5 ppm) Again, this is a site specific cleanup standard and can be changed as more information on the cleanup of Sites 2 and 10 progress.

I hope this letter answers your questions concerning the upcoming UST removal. Please give this Department advance notice of the removal in the event a representative of this office wishes to be present. Feel free to call me at (701) 221-5166 if you need additional information.

Sincerely,

Gary W. Berreth, Coordinator
Underground Storage Tank Program
Division of Waste Management

GWB:lk

APPENDIX C

HEALTH AND SAFETY PLAN

APPENDIX C
HEALTH AND SAFETY PLAN
IMMEDIATE RESPONSE PROJECT

I. PROJECT PURPOSE:

This project may involve release of petroleum products. The work will involve UST and soil excavations, sampling, field screening, and other investigations.

II. BACKGROUND MONITORING:

The background levels of hydrocarbons are to be determined by taking PID readings away from areas of suspected contamination.

The combustibility of gasses in the drilling and construction area will be monitored periodically with an MSA combustible gas indicator. The combustible gas content of the ambient air in the work zone will be checked to ensure that levels have not elevated above 20% lower explosive limit.

No heat-producing equipment (i.e., welders, lighters) will be permitted in the work zone. No welding or other work requiring a heat source will be conducted anywhere on site until the work area has been screened for combustible gases, and the PEER Site Manager has given his express approval for the work to be conducted.

III. ACTION LEVEL:

A PID reading above 10 ppmv in the work/breathing zone will be cause to stop work, depart the immediate area, or don full-face or half-face protective respirators (Level C) until the levels drop or a determination is made as to the source and personnel health considerations. The site manager shall make that determination after consultation with ANG health and safety specialists if and as necessary.

IV. PERSONAL PROTECTIVE EQUIPMENT:

Personnel will be in Level D protective equipment at all times when excavation and sampling are in progress. Level D consists of:

1. Hard hats
2. Steel toed shoes or boots
3. Safety glasses or goggles
4. Work gloves (except for such functions as instrument adjusting or writing, etc.)

Level C protective equipment will be maintained nearby the site during investigations. Level C consists of:

1. All items from Level D plus
2. Half or full-face respirator with organic vapor cartridges

V. TRAINING:

All personnel will have completed 40 hours of OSHA training and be in a medical monitoring program.

A safety briefing will be discussed during the planning of each day's activity.

VI. RECORDS:

Any unusual occurrences, such as injuries requiring first aid or need for Level C protection, will be documented in field logbooks.